DOCUMENT RESUME

ED 174 788 CE 022 288

TITLE Follow-up Procedures: A Training Guide.
INSTITUTION Virginia Polytechnic Inst. and State Univ., Blacksburg. Div. of Vocational-Technical Education.
SPONS AGENCY Office of Education (DHEW), Washington, D.C.
PUB DATE 79
NOTE 137p.; For a related document see CE 022 287

EDRS PRICE MF01/PC06 Plus Postage.
DESCRIPTORS Guidelines; *Methods; Program Administration; *Program Design; *Program Development; Program Evaluation; *Program Planning; *Vocational Education; *Vocational Followup

ABSTRACT

Based on a national review of student and employer follow-up efforts, this training guide describes the options that are available at each step in the process of designing, developing, and implementing follow-up systems and the advantages and disadvantages in each case. The guide is divided into five major sections. The first section discusses the purpose for this guide and the rationale for conducting follow-up efforts. Section 1 also defines important terms. Section 2 presents the basic consideration in planning the follow-up. Section 3 presents the guidelines for developing the system parameters. Section 4 explains how to design the system in the following stages: define the population; specify data requirements; specify study type (design and methods); and develop instrumentation. Finally, section 5 presents information on operating, documenting, and evaluating the system. (BM)

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ED174788

FOLLOW-UP PROCEDURES: A TRAINING GUIDE

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Developed from the Project
A Comprehensive National Review and Preparation of
Training Materials for Student and Employer Follow-up

1979

The activity which is the subject of this report was supported in whole or in part by the U.S. Office of Education, Department of Health, Education and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the U.S. Office of Education, and no official endorsement by the U.S. Office of Education should be inferred.

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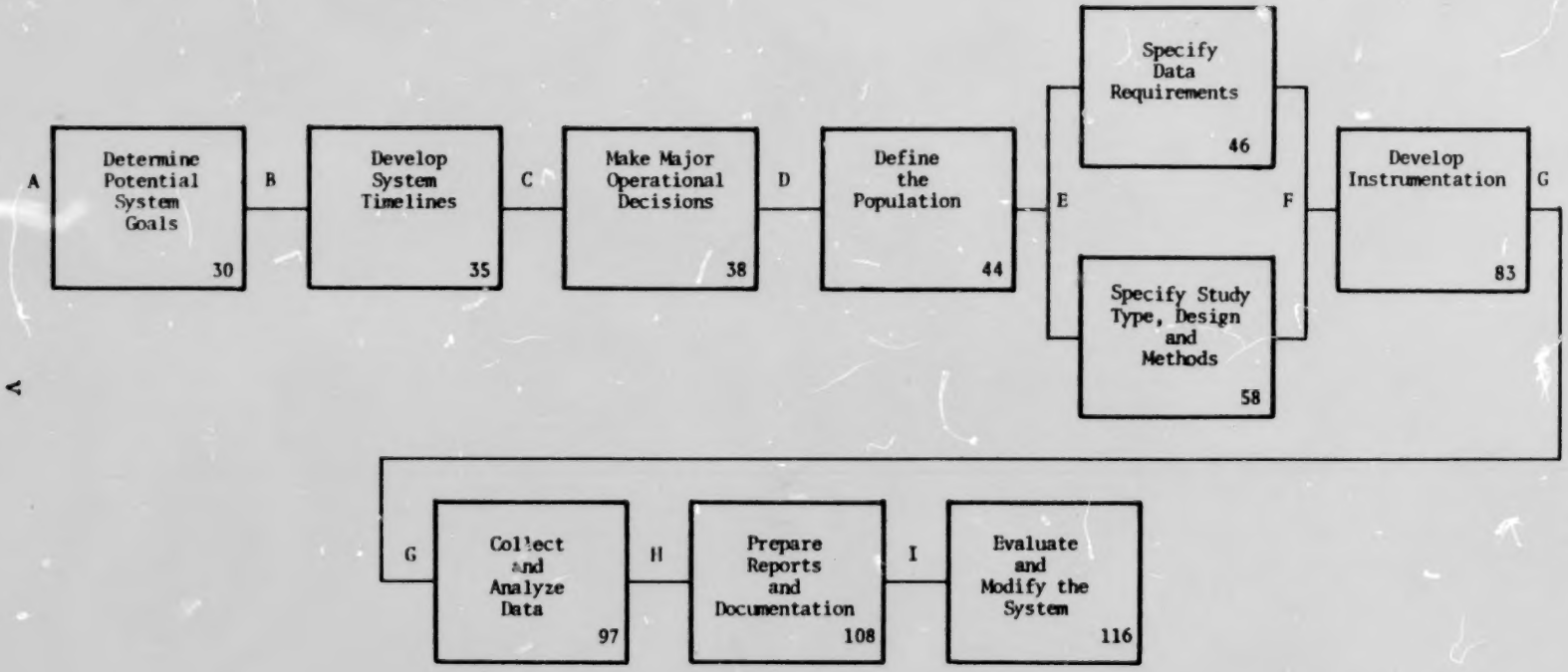
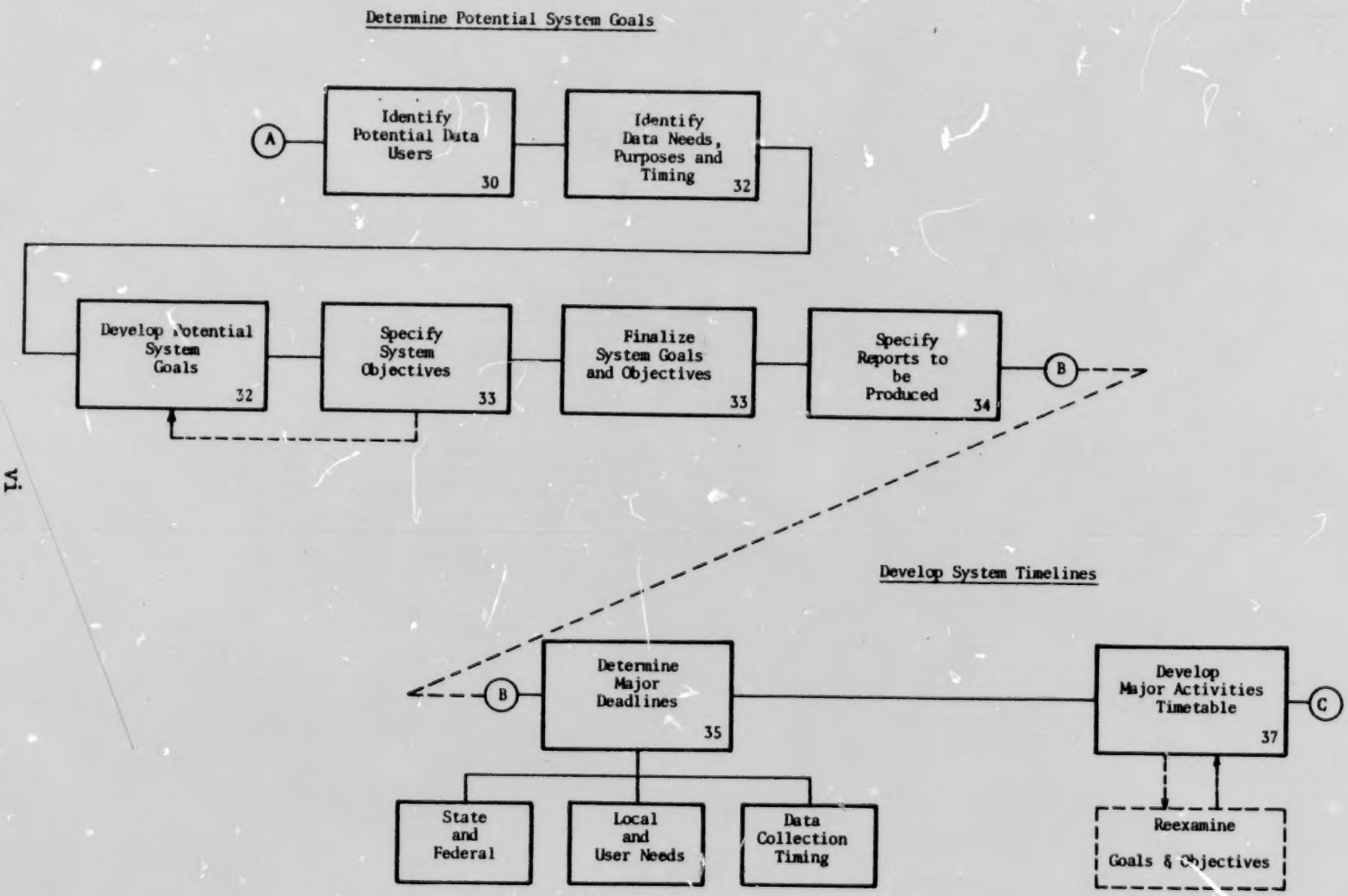
THE FOLLOW-UP PROCESS



The above diagram depicts the major sets of tasks included in the design, operation and evaluation of a follow-up system. Each of the blocks is detailed in terms of its major tasks on the pages which follow. The discussion of a particular task or set of tasks may be located in the guide by referring to the page number listed in the lower right-hand corner of any given block.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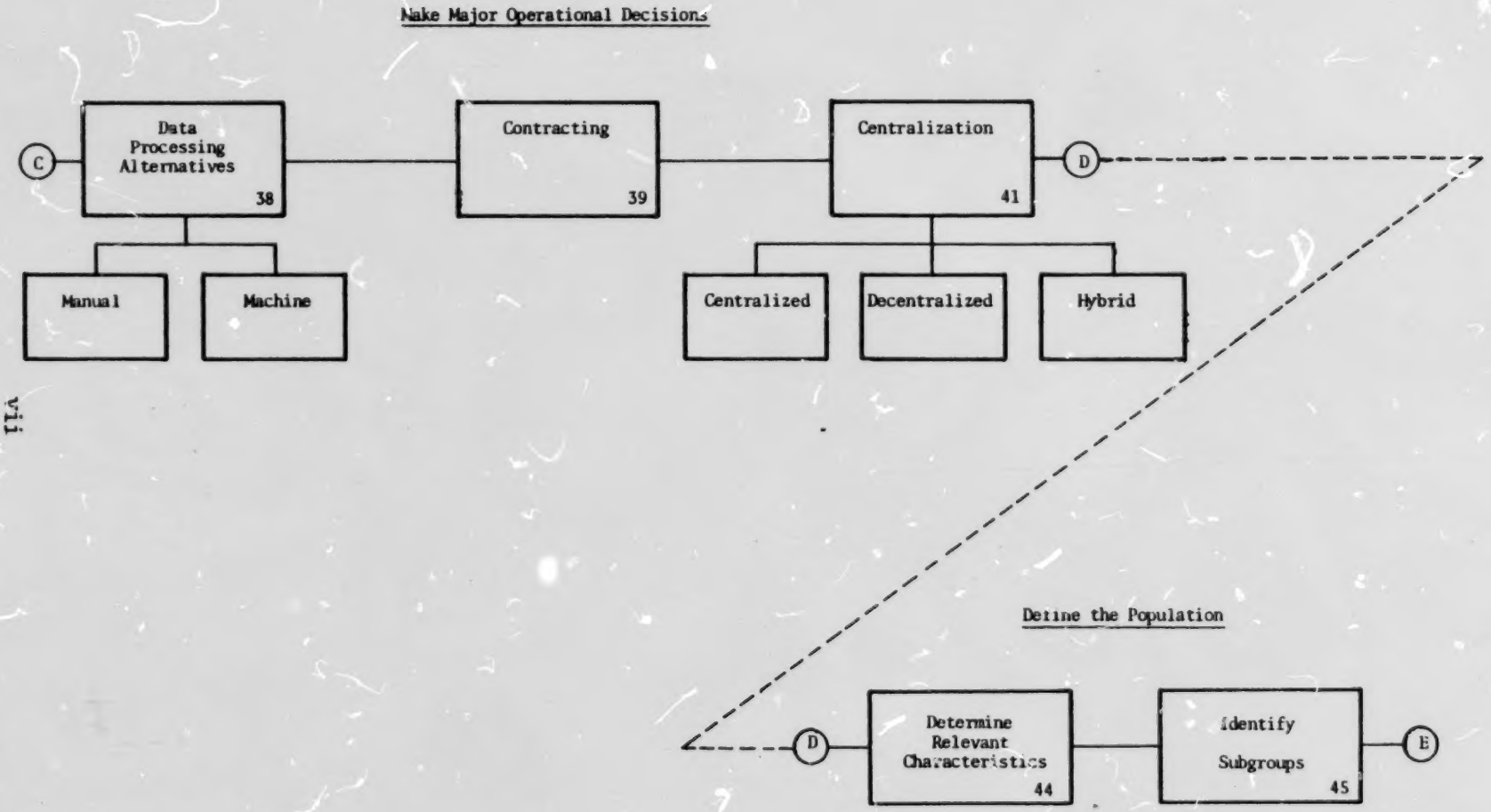
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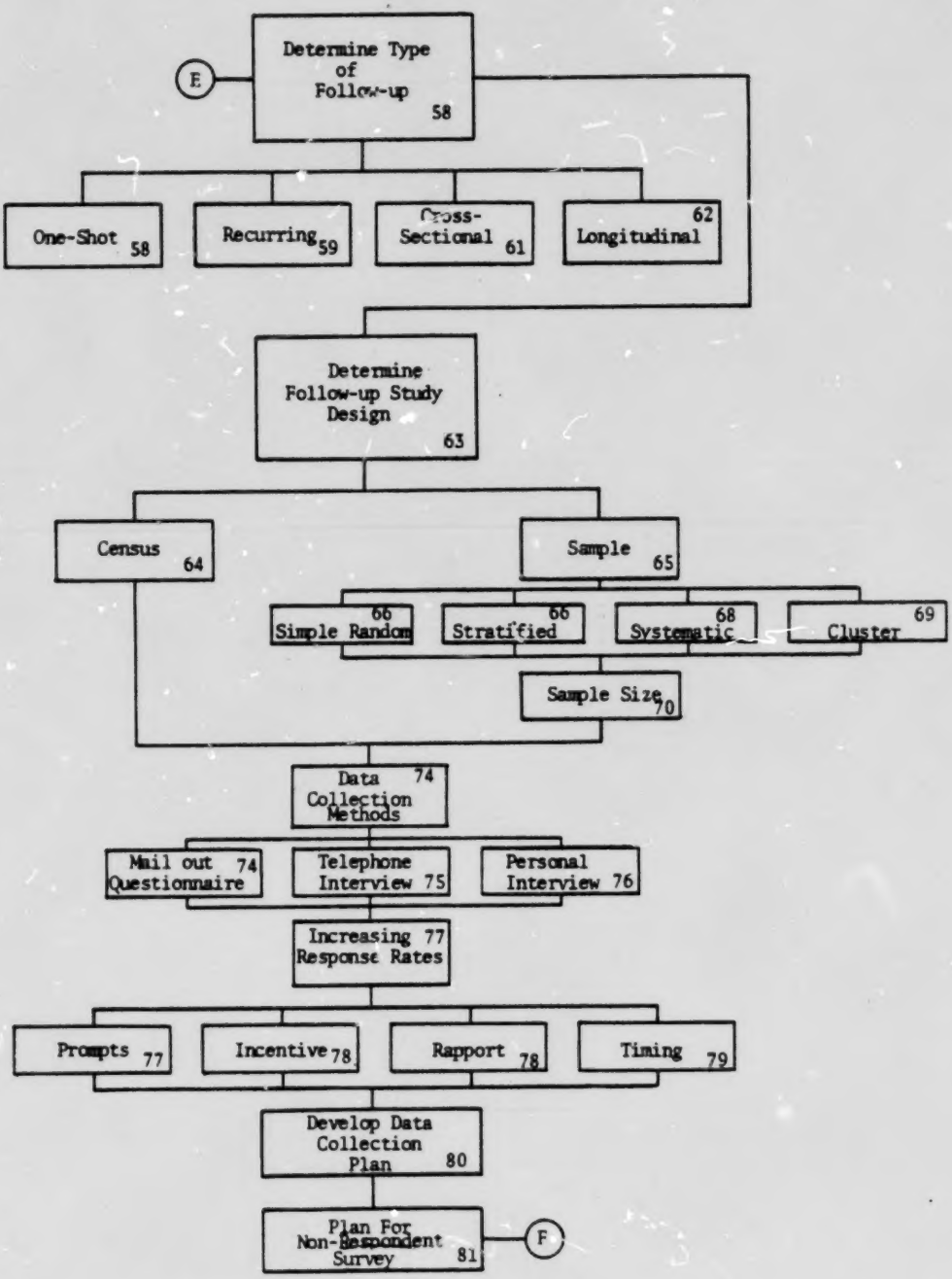

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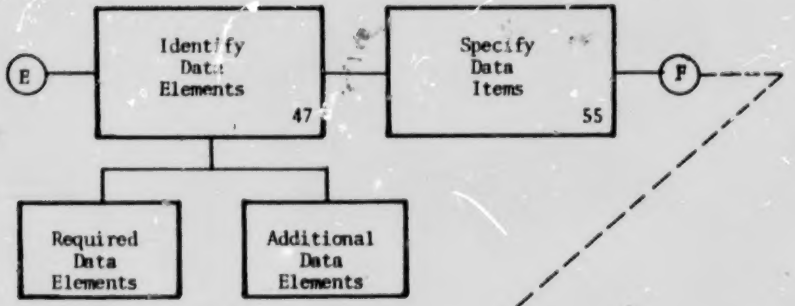

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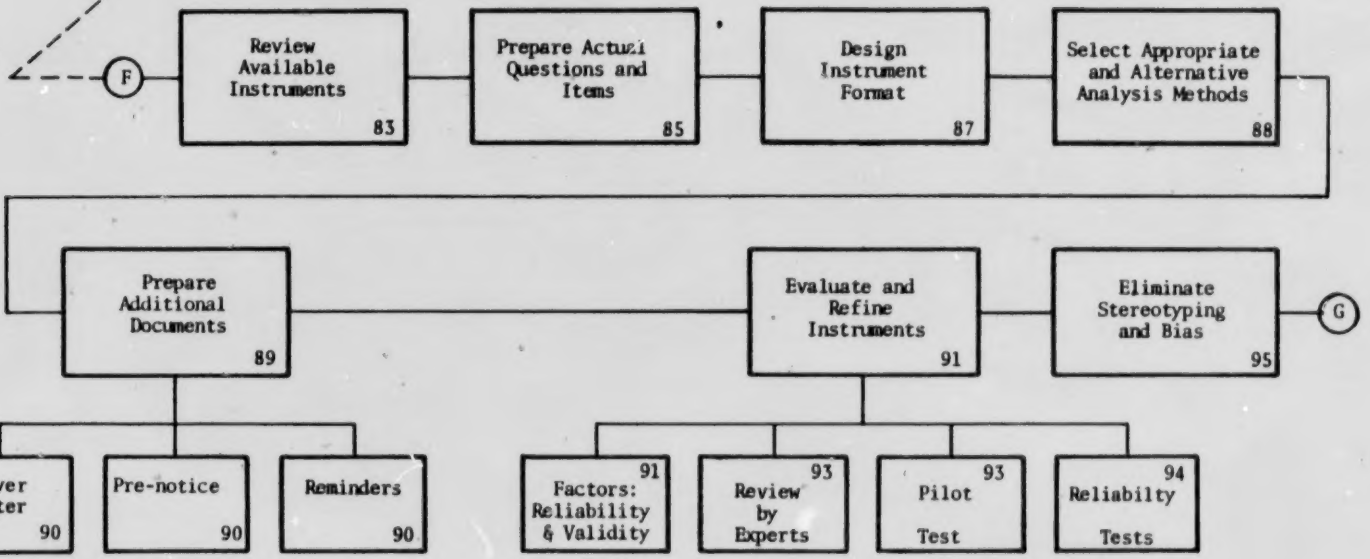

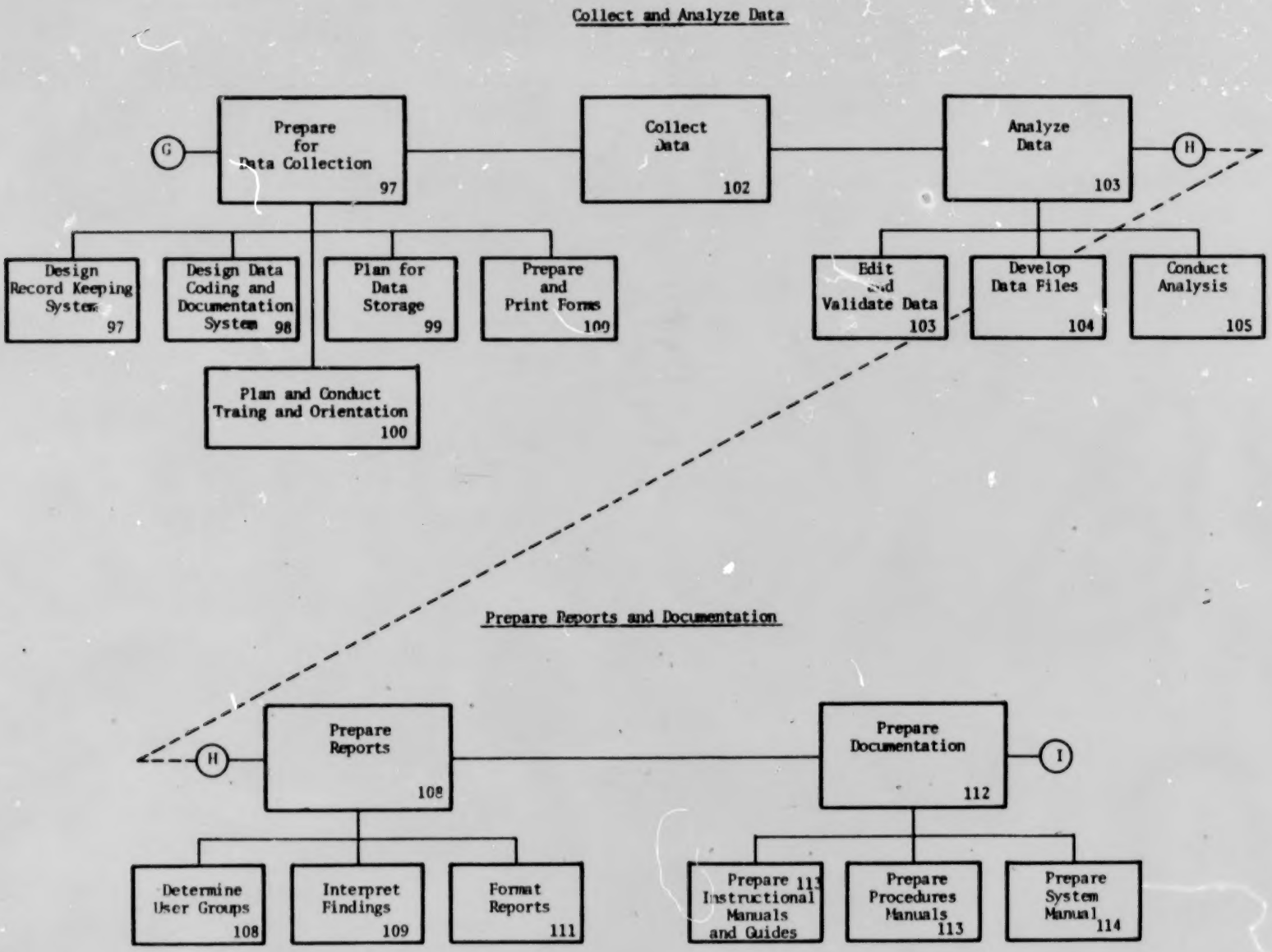
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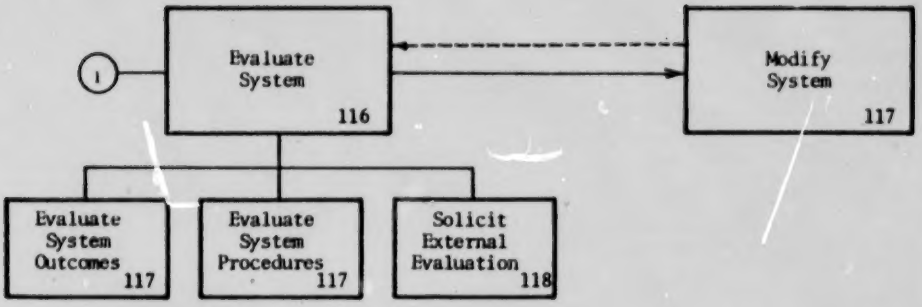


INTRODUCTION

Vocational education has probably had more experience following up students than all the rest of education (and all other occupational training) combined. Since 1965, approximately twenty million vocational students have been contacted or information about them obtained in the year after completing or leaving their programs. In the process, a considerable body of knowledge about the collection and use of follow-up data has been accumulated, only portions of which have been disseminated and then only to limited audiences.

Purpose

The purpose of this Guide is to make that knowledge available to everyone who needs it. There are different ways of collecting information, different kinds of information to be obtained, cost variations, sampling techniques, advantages and disadvantages of individual student data, verification and validation procedures, and many other details about which experience can be used in developing new systems or improving existing ones. In the preparation of this guide, an effort has been made to organize the experience of many States and local schools into a sequence of logical steps from the first consideration of a follow-up system to its complete implementation. It may be used at the local or state levels to design and develop an entire system or to modify components of an existing system.

It is not the purpose of this Guide to single out particular systems now in operation and recommend them to other vocational educators. One kind of a follow-up system with a particular set of characteristics may be quite satisfactory where it is being used, but might not be suited for another State or local school without extensive modifications. In some cases, the choices are simply of convenience or style rather than of a right or wrong way of doing things. In other cases there are tradeoffs -- a less flexible system, for example, in exchange for a lower cost. A major purpose of this guide is to describe the options that are available at each step in the process of

designing, developing, and implementing follow-up systems, and the advantages and disadvantages in each case.

Need for a Guide

Follow-up information is only as good as the system through which it is obtained. There are many local and state follow-up systems in operation, but they vary widely in quality and scope. There has been some sharing of forms and procedures and a certain amount of research on how to do follow-up, but even the research has not been widely disseminated. Many follow-up studies are conducted which are not reported in traditional journals of the field. Consequently, developers of follow-up systems appear to be repeatedly re-inventing the wheel, and with uneven results.

A comprehensive review of existing systems was conducted prior to development of this guide. This review revealed follow-ups with return rates ranging from a low of eight percent to as high as 100 percent. Very few systems reviewed attempted to follow-up employers of vocational students, which is now a requirement under 1976 Federal legislation. The review of existing systems, while revealing a wide range of differences in procedures and some questionable practices, also demonstrated that excellent procedures and comprehensive systems do exist. This guide is an attempt to bring together in a useable format the best of what was found.

How It Was Done

"A Comprehensive National Review and Preparation of Training Materials for Student and Employer Follow-up" is the title of a research project from which this guide is a product. It was approved for Federal vocational education research funds under Part C late in 1977. The purposes of the project were to conduct a comprehensive national review and synthesis of vocational student and employer follow-up and to use the findings of that review in the development of a training manual. Traditional literature review procedures were used, but in addition, inquiries were made of key individuals in each

state, territory and the Canadian Provinces to obtain current follow-up materials and reports. The focus of the review was on methodology, not data. Over 1,000 pieces of information related to follow-up were obtained, and over 300 documents directly related to student or employer follow-up were reviewed in detail.

There are two products of the project: this guide, and a companion document, "Follow-up Procedures: A National Review." While the guide is complete in itself, the review document may be used with it to locate follow-up studies in which particular practices have been used. The reader may wish to examine these in greater detail, which can be done by referring to the review document. The review document may also assist the reader in locating individuals who have designed or are using follow-up systems of particular interest.

Rationale for Follow-up

Issues

There are at least five issues involved in whether or not to collect follow-up data.

a. The need for information in program planning and improvement and occupational information systems versus the cost of obtaining that information.

b. The public's right to know versus institutional objections to exposure.

c. Knowledge versus intuition in educational practice.

d. Improved performance versus complacency in an institutional environment.

e. Students' rights of privacy versus obligations incurred in public education.

Some of these are more theoretical than real, and each of them undoubtedly is of greater importance to some administrators and teachers than to other persons involved in decisions to collect follow-up data. All of them need to be considered. There are basically two reasons to collect follow-up information: a legal or administrative

requirement to do so; and a need to know what is or is not being accomplished in vocational education programs. Both are important. The first is essentially an audit function, a measure of compliance, a means of knowing the extent to which funds used are producing the results intended. It is the critical element in accountability. The other is the means by which an administrator or a teacher measures program success, knows if instructional improvements should be made, and develops information describing what vocational programs do for individuals. It is the critical element in planning public relations and in decision-making.

Against these reasons for collecting follow-up data, there are at least two opposing arguments. One is that it costs money, and the other is that most people just don't like having their performance exposed to public scrutiny. The first of these will be discussed in the next section of this guide, but must be recognized at the outset as a problem to be faced. The second is rarely discussed but is often formidable. In its mildest form it is an irritant. In its worst form it is a paranoia, a fear that we will be found accomplishing less than we like to think we are, or more to the point a fear that the job we are doing will look worse than what someone else is doing. Individually, most administrators and teachers will not allow themselves to be identified with such an attitude, but as members of an institution they may feel a certain proprietary obligation to protect the institution's image. It is a widespread institutional characteristic to which schools and state departments of education are as susceptible as any other public agency.

There are two additional characteristics of education which may not result in open opposition to the collection and use of follow-up data but can reduce their effectiveness. One is a preference for making decisions on the basis of one's own professional judgment rather than to rely on performance data from another source. In practice, it often amounts to the use of intuition rather than knowledge. The other is an affliction of all organized activity, a sense of complacency

when programs become routine. Program improvement is something to be supported in the abstract but acted upon only under considerable provocation.

The concern for the privacy of individuals has become the basis for objections to follow-up data collection in a number of states and communities. This is not widespread but should be recognized. It is a very proper and legitimate concern, but one that need not interfere with proper and legitimate follow-up of students educated at public expense and in public institutions. Follow-up systems are most flexible when subject identity is included, but, such identity can be dispensed with in extreme cases.

Benefits

The benefits to be realized from a follow-up system are potentially substantial. Work success and satisfaction of former students, their assessment of the school and training program from their post-program perspective, employer appraisal of vocational graduates and/or their training, descriptive data on employment status of former students and other kinds of labor market information all can be valuable inputs to larger systems of program planning and assessment, career guidance and accountability/reporting. If the data should show that all programs are successful, that sutdents and employers alike are pleased with the results, this would be evidence to support program expansion, raise vocational education to a higher priority in relation to other educational programs, and stimulate everyone involved to continue to maintain quality programs. But that is the stuff of which dreams are made, and few if any follow-ups will yield only gratifying results. In the real world, some of the follow-up data will be encouraging, and some less than encouraging. Therein lie the greatest benefits from obtaining follow-up data, however. If they are valid, they help show which programs and under what set of conditions satisfactory results are being obtained and where they are not.

This uneven pattern gives administrators, teachers, and others involved in vocational education an indication of where to direct additional resources or where to withdraw them, which programs to give special attention to, where goals are being met and where they are not, and what changes and redirection in previous years have achieved the results intended and which ones have not. Wherever program strength is reflected in the follow-up those programs may serve as models in strengthening others. Where the results of the follow-up are disappointing, benefits can be achieved through making changes. Programs can be modified, updated, eliminated, or given new direction according to data coming from a follow-up system. This is not to say that each year's follow-up data should result in drastic changes, but the accumulation of data can be analyzed for problems that appear as trends and achievements equally sustained until little doubt remains regarding the degree of success or failure in either case.

The knowledge thus obtained from follow-up data can also be used to help correct situations that call for improvement. If poor program results can be traced to inadequate financial support, the evidence in the follow-up may be used to obtain better support. If former students indicate that the equipment used in their training was out of date compared to what their employers expected them to be able to use, this information can document a request for new equipment. Follow-up data may also indicate the existence of programs from which a majority of graduates are employed in occupations unrelated to their training. Such information identifies the need to assess the job market or programmatic conditions which explain why such a situation exists and what action should be taken. Beyond the program planning/assessment/improvement aspects, the potential of certain follow-up data as one input to an overall occupational information/career planning system has considerable but often underutilized potential.

It comes down to the fact that knowing what happens to students after they complete or leave vocational education programs is the only way of knowing what to do differently and what to continue doing in those programs from one year to the next, or preferably from several

years to the next. It is the difference between administering, teaching, advising, legislating, and even enrolling with a reasonable amount of knowledge or doing these things blindfolded. The benefits of follow-up data in this respect are not bonuses to be gained from spending the money and establishing a system, but the means by which the effectiveness of vocational education can be assessed.

Goals and Objectives

A follow-up system may have as its only purpose to supply data required for State or Federal reporting, and indeed many have no other goal or objective than that. Compliance reporting alone is probably an unjustifiable cost, and it is not surprising that many vocational educators resent the time and effort as well as the cost of collecting follow-up data solely for this reason. The data collected under such circumstances do have some potential value beyond mere reporting, but relatively little compared to what they might have if different goals and objectives were the basis for the system's design in the first place.

Any number of goals and objectives may be chosen in deciding to establish a follow-up system or to make changes in an existing one. Monitoring program quality, keeping programs current with advancing technology, improving vocational education opportunities for the handicapped and disadvantaged, identifying barriers to some programs for certain kinds of students, assessing sex sterotyping, developing programs to meet particular employers' needs -- these are all feasible goals, and there are many more. Too many at the same time might be self-defeating, requiring too much data and reducing the follow-up response. But too few is almost certain to be inefficient. Each agency should weigh its decision carefully as to what it hopes to gain from the follow-up.

In the end, a tradeoff is probably necessary. The possible goals and objectives are limited by the size of the system. A local follow-up system can generally collect data on a wider range of variables than can a state or national system but any system will have to trade

some goals for a reasonable demand on students, teachers, and employers in supplying information. This guide will attempt to supply the information needed in making such decisions. It cannot be emphasized too strongly at the outset that goals and objectives should be formulated, and that they should invariably go beyond supplying data for reporting purposes only.

Definitions

A number of terms are used in the Guide in a context specific to follow-up. The following definitions are provided to clarify their meaning as used here.

Census - An attempt to contact the total population rather than a sample from that population.

Compliance - Complying with or meeting the requirements of a law or agency.

Cross Sectional Study - A study in which data are collected at one point in time from several categories of individuals included in a larger population.

Data Element - A generic category of information such as "employment status" which may contain several data items.

Data Item - A specific piece of information within the data element (category) such as "employed full or part time."

Follow-up - The attempt to secure educational, employment or other information from or about former students for purposes of planning, reporting, evaluation or conducting research.

Incentive - A gift, payment, or technique used to elicit response.

Longitudinal Study - A study in which data are collected at different points in time in order to study changes or emplore time - ordered associations. Three types of longitudinal studies are commonly recognized: trend, cohort and panel. A panel longitudinal study is one in which the same individuals are followed-up at each data collection point. For purposes for the present study the terms panel longitudinal and longitudinal study are used synonymously.

MIS - An acronym for Management Information System. A system for collecting, compiling, analyzing and reporting information needed in making management decisions.

Non-Respondent - Individual who has not responded after all planned data collection procedures have been carried out.

Population - The total group with which the study is concerned.

Reliability - The extent to which an individual's responses to follow-up instrumentation are consistant either within the instrument or over a short period of time.

Sample - A number of students or employers selected from the total population and intended to be representative of that population.

Validity - The extent to which individuals provide the information the follow-up instrumentation was designed to collect.

VEDS - An acronym which stands for the National Vocational Education Data Reporting and Accountability System mandated by the Education Amendments of 1976 (P.L. 94-482).

PLANNING THE FOLLOW-UP

Basic Considerations

There are three basic considerations in developing a follow-up system or making changes in an existing system: How much it is going to cost; the quality of its data, and its adaptability. Each of these is affected by a number of additional factors such as characteristics of population to be surveyed and the uses that are likely to be made of the data. Both the basic considerations and the factors affecting them will influence what the systems can do, the kind of a system it is, and the extent of satisfaction in its performance. In order to avoid false starts, it is adviseable to begin actual planning only after careful attention is given to each of the following.

Cost

Follow-up systems are usually expensive but not always. It depends on the kinds of data wanted, the size of the population or sample from which the data are to be obtained, the procedures used to obtain the data, and the extent to which the data are analyzed for management information and decision making. It also depends on the extent to which tradeoffs are possible between cost on the one hand and quality and adaptability on the other. As a rule, the higher the quality and the greater the adaptability, the more the system will cost. This is not always true, however. A relatively inexpensive system can produce data of quite adequate quality and some flexibility. On the other hand, there are a number of very expensive systems in operation which are producing data of doubtful quality and which are not readily adaptable to new requirements.

There are also several ways of determining cost. One is total cost -- the cost of designing and field testing forms, of equipment, of personnel and training, of printing and postage, telephone calls, data processing, and other expenses depending on the system. Some of these are primarily one-time start up expenditures, but most of the

cost of a follow-up system is in its operation. Whatever the dollar amount the first year and for subsequent years, total cost is what State legislatures, departments of education, school boards, and budget officers are most concerned about. This is the cost that usually represents a constraint on the design of the system.

Another way of determining cost, however, and one that is often more realistic, is cost per student. Other costs of education are reduced to that basic standard and to its variations such as cost per student contact hour, average daily attendance, and average daily membership. This is a particularly appropriate way of computing cost when several school districts share a common follow-up system or when a State system is compared to local school systems. It is useful in comparing costs of the system from year to year, and in comparing the cost of follow-up to other student costs such as instruction and special services.

Still another way of determining the cost of a follow-up system is cost per useable return. This is something that cannot be figured in advance or even reliably estimated, but it is a very important basis for measuring the efficiency of the system after it is in operation. Actually, it serves a double purpose. It provides a sound basis for determining the cost of obtaining follow-up information from each respondent, and it serves as an incentive to obtain the highest rate of response possible thereby lowering the unit cost. Careful cost analysis serves to identify those procedures that are effective or ineffective in minimizing unit costs.

Ideally, follow-up systems should be planned to meet specific needs and then adjusted to fit cost requirements. Too often they are planned instead within the limits of pre-determined fiscal constraints, which has the effect of restricting the investigation of alternatives and stifling creative planning. Rather than a top limit imposed from the beginning as a constraint, a bottom limit may in fact be a more critical consideration, since for every proposed system there is a level of investment below which that system cannot be expected to produce useful information or have credibility. The following is

suggested to anyone who is thinking about developing a follow-up system or adding to or making changes in an existing system: explore first the factors affecting basic considerations which are listed below; then gather cost data for each of several alternatives in the design of the system itself; and finally decide the lowest cost that would be acceptable in order to produce the necessary results. In other words, while cost is an important basic consideration in establishing a follow-up system it should be an on-going rather than the initial consideration in planning the system.

Quality

Quality, like cost, can be viewed in different ways. Accuracy of the data, the detail in which the data are obtained, and their flexibility and analytical usefulness are all measures of the quality of a follow-up system. How efficiently and effectively the system meets the information needs of those using the data is another measure of its quality. The significance and utility of the data being collected as against interesting but unimportant information is another measure of the quality of follow-up. The system's credibility, its ease or difficulty of operation, its acceptance by the agency and participants -- these and still other characteristics reflect the quality both of its initial planning and design, and of its subsequent operation. All of these measures should be kept in mind and weighed carefully when decisions are made as to the kind of a system a state agency or local district plans to develop.

It is difficult to lay down rules and guidelines by which the quality of a system can be determined, because as with costs, they vary under different circumstances and in different situations. A small system, the only purpose of which is to get student feed back for program updating and student guidance, can employ a variety of collection practices yielding data that are perfectly satisfactory for these purposes but lack the quality necessary for statistical analysis. At the same time, an elaborate system producing excellent statistical data may be of very poor quality in evaluating programs if

the particular data necessary for evaluation are not planned for and built into the system. In planning any follow-up system, quality control and quality of results must be built in, but only as they relate to the purposes of the system and its intended use. In the end, this is often a matter of judgement, and differences of opinion may easily occur.

Adaptability

Adaptability is the extent to which the follow-up system can respond to changing circumstances. Ideally, the system should be able to respond to all present and future data needs without modification, but that is highly unlikely. Maximum adaptability will depend on cost, quality requirements, and the tradeoffs that are necessary to come up with the system best suited to the particular situation it is designed to serve. The point to remember is that adaptability should not be ignored. A reasonably inexpensive system can turn out to be too expensive if it cannot be adapted to changing data requirements. Within the limits of cost and quality that are possible, maximum adaptability should be an overriding consideration in the planning of any follow-up system.

There are two kinds of adaptability to be considered: data adaptability and system adaptability. The first is the extent to which data can be used for purposes beyond those known at the time the system is established, providing answers to new questions and information for new decisions. System adaptability on the other hand is the extent to which the system designed to serve one set of purposes can be used to serve others not anticipated. A good example, though not often found, would be a system which includes information about employer identity simply to know the areas of the employment market being served, which could then be adapted to getting employer satisfaction information after the 1976 Federal legislation made that a requirement.

There are two critical factors affecting data adaptability. One is the extent to which individual rather than aggregate data are

collected. Individual data offer maximum flexibility; aggregate data limit the system to only those uses for which it was intended when established. The second critical factor is the form of data collected. Given the practical limits of data which can be collected without overloading the system, the selection of what will be collected and in what form becomes crucial.

System adaptability is necessary for use in a changing environment. It includes the extent to which the system can interface with newly emerging planning and evaluation programs, the extent to which it can be used with different kinds of computer hardware and software, and the extent to which it can be used in a changing political or legal environment. It is not generally possible to foresee the changing demands which may be made on the system or the changing circumstances under which it will have to be operated at future points in time, but to know that some changes are almost inevitable will keep the need for such contingencies in mind during the planning process. Cost and quality alone as the only basic considerations could be self defeating; cost, quality, and adaptability must each be weighed both against each other and separately in planning the best follow-up system for any given situation.

Factors Affecting Basic Considerations

While cost, quality, and adaptability are interrelated, they are also affected by any number of additional considerations. The following list is not exhaustive and should not be treated as though it were. In every situation there may be factors other than those listed. The factors listed are almost always present, and system planners will be aware of others. They cannot and should not be ignored. To do so can only result in disappointment and perhaps failure when the system is implemented.

Purpose of the Follow-up

The purpose or the reason for conducting the follow-up affects almost every decision made during the planning and design of the system. The products of the system must satisfy the purpose for which it was designed, but it might also be designed to serve additional purposes. There are two major decisions about the purpose of the system, each of which will affect other decisions.

(1) Compliance or Decision Orientation: A compliance oriented system is designed to produce only the information required for reporting data intended to show that Federal and perhaps State regulations are being complied with. It can be designed to collect only the data required and to do so as accurately as possible for a minimal expenditure of time, effort and money. A decision oriented system, on the other hand, produces data required for reporting but its primary purpose is to supply information needed for making management and policy decisions. This calls for more data than for reporting, but the main difference is that the data are more flexible and can be analyzed in a variety of ways. The compliance or decision orientation depends on a number of factors including what and how data will be collected, what kinds of analyses are to be made, what kinds of reports are to be generated, who will receive data and reports, and the uses to be made of them.

(2) One-Shot or Continuing Effort: In some cases follow-up systems or components of follow-up systems may be designed to produce information for a particular need which is not expected to recur. Most systems, however, are developed to meet recurring needs, such as when comparisons are to be made between data collected at different times or when students are to be followed up at different points in time. A one-shot follow-up would involve only temporary arrangements, while a continuing follow-up would involve longer term commitments of staff, equipment, supplies, procedures,

and financial resources. This decision will affect other decisions such as what data to collect, how data will be collected, how data will be stored and for what period of time, how extensive the documentation of data will have to be, and provisions for updating individual student files if information is to be collected at more than one point in time.

Reporting Requirements and Timelines

Regardless of the purpose for which a follow-up system is developed, reporting will be one of its functions if not the only one. Reports invariably are tied to delivery schedules, and these require timelines tracing back through the system so that each step is carried out in orderly sequence. Reporting requirements and timelines are often based on more than one delivery schedule to meet the needs of such groups as:

1. Federal agencies, i.e. the U.S. Office of Education and the National Center for Education Statistics.
2. State agencies, i.e. the State Department of Education and the State Legislature.
3. Other data users, i.e. the State Advisory Council on Vocational Education, placement or guidance personnel, local planners, administrators and teachers.

Meeting reporting requirements and setting timelines are often very involved and difficult decisions in planning a follow-up system, and will have direct effects upon as well as be affected by the cost, quality, and adaptability of the system. There are a number of considerations that may have to be made, including:

1. The stability of reporting requirements and schedule, and therefore of the timeline, i.e. the extent to which kinds of data and when they are needed are likely to change.
2. Sophistication of users and their needs: Simple compliance oriented reporting systems create relatively few problems in the consideration of cost, quality, and adaptability. Decision

oriented systems may be fairly uncomplicated also, but depending on the needs of all of the user groups it may be advisable to consider a certain degree of sophistication. This is particularly true as it relates to the areas of analysis and reporting.

Simple frequencies with bar or pie charts may be the most appropriate analysis and reporting techniques for certain data items and audiences whereas cross tabulations showing the relationship between variables may be more appropriate in other instances. Decisions related to the collection of categorical or interval data must be keyed to the type of user need. In making decisions about reporting, the potential for misunderstanding by any user group must be kept in mind. For these reasons it is important that, in planning a follow-up system, more information about data users' needs should be obtained than simply the data items requested. If this is not done, the requested data items may be collected and reported in a form inappropriate to their needs.

Population Characteristics

Among the most important factors affecting cost, quality, adaptability, and major design decisions of a follow-up system are various characteristics of the student and/or employer population to be followed up. These include:

1. Size. The number of persons in the population is an obvious factor in the cost and the amount of work required in establishing and operating a follow-up system. A large population may require the use of a sample to limit the cost, but that requires expertise and quality control beyond what is necessary in a follow-up of the census or total population. In a small population the use of sampling techniques may not be appropriate. In either case there are other advantages and disadvantages which will have to be weighed, but the size of the population will be a major consideration.

2. Geographic dispersion and/or mobility. Some student populations are highly mobile, such as migrant labor and some inner city groups. Others, e.g. some rural and small town neighborhoods, are fairly stable. The dispersion of the population is affected by the characteristics of the locality as well as the population's mobility. All of these factors must be considered in designing the follow-up, because they will affect its cost and other major considerations as well as methodology. Response rates are particularly sensitive to mobility of the population and dispersion may increase the cost and effort of contacting non-respondents.
3. Uniformity. The similarity or lack of similarity of persons being followed up will affect the size and kinds of sample to be used if sampling is considered. It also affects the kinds of questions asked, the design of the questionnaire, and the rate of response. It is an extremely important factor which too often may be overlooked.
4. Special characteristics. Individuals with handicapping conditions are enrolling in vocational education programs in increasing numbers. If the population includes former students who have sight, hearing, mental, reading, language or other handicapping conditions, this must be considered when developing instrumentation, selecting data collection methods, selecting a sample design if sampling is used and other decisions. Developing procedures that will make it possible for, and encourage, individuals with handicapping conditions to respond can be both challenging and costly. However, it is important that their input be obtained if improvements are to be made in meeting their needs.
5. Subject status. It is more difficult to locate and obtain responses from some individuals than from others. Former students who are unemployed or left programs prior to completion are possible examples. The amount of time that has elapsed since subjects left the program affects how easily

they can be located and a response obtained. When seeking information from groups that have traditionally been difficult to locate or get responses from what data will be sought and how are very important considerations.

Existing System Components

What already exists invariably affects what is being planned, even if an existing system is to be totally replaced. In most cases existing systems are not totally replaced, however, and planning a system or part of a system may require that major consideration to be given to the remaining components. The following are examples of such components:

1. Existing equipment. This is probably the most important single constraint on a new system if it is already on hand and must be used. There are limitations, especially in older equipment, which restrict questionnaire form, type and quantity of data collected, procedure selected for data collection, analysis and compilation, and survey population. Consideration of these limitations must be weighed in terms of an existing advantage-ownership of existing equipment can greatly reduce the cost of a new follow-up system.
2. Existing software. This is related to existing equipment, and exists if such equipment is a consideration. Its importance lies in the cost of writing new computer programs versus the additional value of the system and the information it produces by doing so.
3. Existing personnel. This includes data processing personnel and also those who will have responsibility for the collection and validation of the data. If no automated system existed, the individuals who have previously gathered and compiled follow-up data manually may have to be considered. Changing personnel is often more difficult -- and may be more inadvisable -- than changing equipment. Special training or personnel reassignments may be necessary.

Planning a follow-up system or part of one could be an exercise in futility unless personnel considerations are included almost from the beginning.

4. System interface. The follow-up is rarely an information system standing alone, and in designing a new follow-up or a new component of an existing system, its required interface with other systems, existing or planned, will be a vital consideration. Usually it must interface with an enrollment information system and it may very well have to interface with other educational, planning, financial, and reporting systems. Any or all of these may complicate the planning of the follow-up, but they may also increase the options available.

Legal Considerations

The only legal considerations that would ordinarily affect the design and development of a follow-up system are those dealing with privacy. State and federal legislation have been implemented to guarantee the privacy of individuals and protect the confidentiality of certain data which appear on student records. There is no problem when a local school or district is following-up students whose names and addresses and other private information are in the institutions own records. There have been problems, however, in a few states in allowing private student information to leave the local school or district for use in a State-wide data collection system. If names and addresses of students cannot be obtained by a state agency a state follow-up system will have to be designed in such a way that the local schools have responsibility for collecting the data.

In at least one State and probably others, the State educational agency discontinued its direct follow-up of students when faced with a legal prohibition against obtaining names and addresses or identifying student numbers. It would not have been necessary to discontinue collecting individual student enrollment data if non-identifying sequential numbers were used. The State follow-up could also have

been continued by sending the forms to local schools for mailing, and individual data could still have been linked with enrollment data through the file numbers without revealing the identity of individual students. Individuals planning a follow-up effort should consult with the State Attorney General's office to identify and clarify the state regulations which affect the collecting and/or reporting of student data.

Federal Regulations which affect the efforts to conducted follow-up are the Family Education Rights and Privacy Act (Public law 93-380 as amended by section 24 Public Law 93-568) and the Federal Freedom of Information Act, Title 5 USCA 552. Both acts cite several regulations which affect the collection and reporting of individual data. Requirements of the Family Educational Rights and Privacy Act which affect vocational education and the section of the act which may be referred to for more clarification are:

1. the student (18 years or older or attending an institution of post-secondary education) or parent/guardian must give written consent for use of a student's records. (4d) (6bI)
2. data may be given to an authorized agency for analysis purposes as long as the data cannot be identified with individual subjects. (B) (C)
3. state or federal agencies may be granted access of records if it has been determined that a legitimate educational interest exists. (6A-I) Examples are:
   - school officials for specified purposes
   - official of other schools to which a student may transfer
   - parents of a dependent student
   - sponsors of financial aide
   - authorized government officials
   - organizations conducting school related studies
   - professionals requiring records in health or safety emergencies
4. "directory information" can be released to anyone without getting prior permission (5A)

The Act provides that information used for education purposes such as follow-up: must give assurance to respondents that the

information is held in confidence and that only aggregate data will be publicly disseminated.

Legislation which affects data gathered on former students, now employees, is the Federal Privacy Act; Title 5USCA 552A. This legislation requires employers to maintain record confidentiality. Most large employers will be aware of the laws which apply to the collection of data on employees. In general, guidelines require that:

1. a waiver to release information should be signed by either the employee or if the employee is under the age of 18 then by a parent or guardian.
2. the employee should be informed that follow-up data is being collected, what agency is collecting the data, the purposes for which it will be used.

The guidelines and regulations reviewed suggest that pupil records are not "public records" nor are they "private records." Pupil records are quasi-public records because they are generally required by law to be kept, are supported by taxes and serve an important public function. Yet pupil records are "private" in the respect that they contain personal data about individuals. Therefore, educators conducting vocational follow-up efforts should be aware of the balance between the right of the pupil and the right of the state.

It is suggested that the specific procedures to be used in the student and/or employer follow-up be reviewed by school division or state educational agency level personnel. Existing systems and modifications should also be submitted to review in light of recent legal interpretation of the relevant laws.

Political and Ethical Considerations

Aside from the possibility of legal restrictions affecting the design and thus the cost as well as the quality and adaptability of a follow-up system, there are often restrictions of a political or ethical nature which must be recognized. Some of the most important and most frequently encountered are the following:

1. Safeguarding data access and use: Anytime a school district or State agency collects information about individuals it incurs the responsibility of assuring that such information is accessible only to those who are supposed to have it. The data must also be used only for purposes which are within the proper role of public education. Unauthorized access or improper use of the data may not only be harmful to the individuals affected but can result in distortions, and unjustified interpretations. These can be used to shield a poor performance record from public view, or to discredit programs and individuals unjustly, or to grind any number of political axes.

   On the other hand, too much zeal in safeguarding educational information from public access can be equally indefensible and improper. When planning the follow-up it is best to consider at a fairly early stage what safeguards will be necessary to prevent misuse of the data without infringing on a proper public interest. In doing so, political realities are sometimes more important than abstract ideals, although neither should be ignored. What is most important is that some thought be given to this matter at an early state in the planning rather than ignoring it and running into trouble later.

2. Dissemination: Apart from access to and use of the data, the way they are distributed -- to whom and in what form -- may also involve political or ethical considerations. Obviously the data must be disseminated to a number of persons and groups or the cost of its collection cannot be justified. Just as obviously, the data cannot be disseminated to an unlimited number of users or the cost of dissemination would overburden the system. So, who is to be included and who gets left out?

   Even more importantly, in what form or forms will the data be disseminated? Obviously again, all of the data

collected cannot be disseminated; the sheer bulk would make it impossible, and without organization the data would be largely unintelligible. Aggregations, compilations, and analyses must be made. The question to be considered in planning the system is what kinds of aggregations, compilations, and analyses are appropriate. A second question is, to what extent will they be disseminated only with interpretative explanations by knowledgeable persons? Many follow-up system planners and developers seem to ignore this consideration, yet to do so can result in a variety of political and ethical problems.

3. Reasonable promises and claims: There is often a difference between what the developers of a follow-up system would like to be able to do and what they actually accomplish. Unfortunately, this difference may become blurred in the glow of proprietary enthusiasm.

   Promising more than can be delivered either in data quality or in the kinds and variety of data output will almost certainly run into political and ethical problems. This is particularly true when seeking or maintaining financial support. It is also true when involving individuals and groups in the development of the system. Planning a follow-up system must be realistic and even restrained in terms of the data it will be expected to produce. This does not mean that goals should be low and effort should be limited. Enthusiasm is necessary in every enterprise, and a follow-up system's maximum potential has to be a constant consideration in its planning. But the political and ethical problems which will be almost inevitable if enthusiasm alone is translated into promises and claims can seriously distort the cost, quality and adaptability of the system being planned.

Climate of Acceptance and Support

After every other factor affecting the planning of a follow-up system has been considered, there is one more which can be the most critical of all. The attitudes of persons and groups involved toward one kind of a system or another, or toward any kind of a follow-up, may determine what is eventually done. A very careful assessment of such attitudes and support early in the planning stage is essential. If the situation is positive, there are advantages in knowing this early and in knowing where support is strongest and where it is less strong. If the situation is negative, it need not be hopeless. Negative attitudes and lack of support may be evident because of circumstances with which one can deal. The following are examples, but there may be others just as important.

1. Previous experience: A satisfactory history of collecting follow-up information in a community or State would help considerably in planning a new system or part of a new system, but the opposite may often have to be expected. There have been numerous experimental efforts based on a trial and error approach which have not been well designed or carried out and which have left a certain amount of antagonism in their wake. One State system, for example, was picked up by a private company organized for that purpose and sold to several other States, where it failed in each case because the company could not duplicate the technical competence needed to make it operate. In many States and school districts the only experience with follow-up has been with a manual system and to suggest the use of a computer creates apprehension.

   Whenever there has been a previous unsatisfactory experience or relatively no experience, special efforts may be necessary to overcome negative attitudes. A public relations program to clarify the kinds of data to be collected and how they will be used is often advisable. In general, the more information that can be provided about the way the

follow-up is being planned while still in the planning state, the more acceptance and support it will receive, especially if there have been previous problems with attempts to collect follow-up data. Without some effort to inform the persons and groups who will be involved with or affected by the follow-up, a memory of earlier experiences will in most cases create resistance rather than acceptance and support.

2. Fear of evaluation: Most persons are probably less than enthusiastic about having the results of their work evaluated, and follow-up is often viewed by vocational teachers or administrators as a kind of backdoor evaluation. It is always advisable to provide as much feedback as possible to instructional and administrative staff, and to consider their suggestions about data to be collected and the ways they are to be used. Here again a public relations program serves the purpose not only of reducing opposition because of previous experience but also in overcoming too great a concern about the evaluative uses of follow-up information. A focus on the non-evaluative purposes of the follow-up can at least make skeptics aware of many positive aspects.
3. School-community relations: The general nature of the relationship between a community and its schools, or a State and its educational establishment, can greatly affect the development of a follow-up system and the decisions that have to be made in its planning. A close and positive relationship between vocational education and employers will present a much different situation for employee follow-up than one in which employers have not been involved directly in the schools' programs.

The support received from parents in locating former students or supplying data for them will also depend to an important extent on the overall school/community relationship. If a community or a State differs over educational issues such as teacher strikes, tax support, or busing it

will be more difficult to develop a follow-up system. Follow-up data collection is dependent upon voluntary cooperation from students, parents, and employers. If friction and tension exist over any issue in the educational system, the only way to obtain that cooperation will be to build into the system a program of public relations designed to gain the support needed to make the system work. This is a difficult but by no means impossible step to include in the planning process.

DEVELOP SYSTEM PARAMETERS

Major Follow-up Activities

There are various opinions about what the major activities are in planning and conducting a follow-up. Exactly what names are given to the activities and what each encompasses is not important as long as they are inclusive of what must be planned. Whether a new system is being developed or an existing system is being modified, the steps are usually the same but with a different emphasis. This guide deals with the major steps without limiting them either to a new system or a new component or modification.

Most systems which have been described in the literature have lists of major activities, and a number of them can be found in the procedures manuals cited in the companion document to this guide, Follow-up Procedures: A National Review. Three are summarized here to illustrate both their variety and their similarities.

The Minnesota procedures manual for the secondary follow-up system (96) has these as major tasks, activities, or concerns:

(1) Identification of School Leavers and Sub-Groups
(2) Collection and Coding of Base Information
(3) Preparation and Mailing of Questionnaires
(4) As Questionnaires are Returned
(5) Non-Respondents
(6) Coding
(7) Preparation for Data Summary

An additional task is listed in Minnesota's report of the follow-up results: Training and Monitoring. (98)

The report of a follow-up of Secondary BOCES Graduates in New York (235) lists these as the major tasks:

(1) Accomplishment of Preliminary Research Data
(2) Development of the Survey Instrument
(3) Procedural Responsibilities
(4) Collation of Materials

(5) Analysis of Survey Response

(6) Final Report

A more extensive list of tasks is found in the Operations Manual of the California Student Accountability Model (64):

(1) Prepare Follow-up Matrix

(2) Decide on Purpose(s)

(3) Select Group(s) from Matrix

(4) Assign Responsibilities

(5) Prepare Students for Follow-up

(5A) Determine Sample Size

(6) Prepare Target List of Names

(6A) Select Methods(s)

(6B) Select or Construct Instruments

(7) Prepare Time Schedule

(8) Collect Data

(9) Analyze Data

(10) Disseminate Findings

(11) Make Appropriate Program Adjustments

A synthesis of the major tasks most frequently cited and which research and experience indicate are essential has been developed. There are ten:

(1) Determine Potential System Goals

(2) Develop System Timelines

(3) Make Major Operational Decisions

(4) Define Population

(5) Specify Data Elements

(6) Specify Study Type, Design and Methods

(7) Develop Instrumentation

(8) Collect and Analyze Data

(9) Prepare Reports and Documentation

(10) Evaluate and Modify the System

Determine Potential System Goals

An examination of follow-up reports, guides and manuals from across the country indicates that only a small percent actually state the goals or objectives of the follow-up. This is an unfortunate omission. A study completed by the Center for Vocational Education (116), reported the most frequent reason non-respondents failed to respond to follow-up questionnaires was the lack of perceived importance. Sixty-one and one-half percent stated that a better explanation of the purposes of the follow-up might have prompted them to respond.

Goals and objectives, even if not stated, are often implied by the type of data collected or reports prepared. A summary of goals and objectives listed for the follow-up studies reviewed is available in the companion document. From that summary, it is possible to analyze in retrospect what seems to be necessary in developing potential goals for the follow-up system. Some of the major purposes of any system will be mandated by local, state or national requirements for reporting, and these are not likely to be ignored. If they are the only purposes, however, the system may be both inefficient and ineffective. Only a systematic approach to goal setting will achieve maximum usefulness and also focus attention on the three overriding design considerations of cost, quality, and adaptability. The following steps are suggested as a way to proceed.

Identify Potential Data Users

Logically, a follow-up system should be designed to best meet the information needs of its user groups within specified cost and time constraints. Certain of the user groups are conspicuous by their recurring data requests, e.g. local administrators, state departments of education and the Federal government. Other potential users of follow-up data may not be as obvious. These could include the vocational instructors themselves, school guidance personnel, business/industry/labor associations or representatives, local and state service area supervisors and administrators and the general public. On the

other hand, the system cannot be all things to all people without overloading the design and probably the cost. A selection has to be made. Two ways of making the selection are: (1) Develop a set of general data classifications and consider who might have a need for the different types of data; and (2) use a broadly based advisory group to identify potential users and their data needs.

In the first approach, known data elements should be classified, then a projection made of what groups would have a legitimate use for and interest in each identified data type. As an example, data which may be collected from employers could be classified as (1) evaluation of employee knowledge and skills, (2) evaluation of employee characteristics such as punctuality, cooperation, etc., and (3) satisfaction of employers with employees and the employees' training. Each of these categories may have many specific data items of interest. Ratings by employers of vocational graduates' skills could be used in a global sense for program evaluation by administrators or in a specific sense by instructors for course evaluation and revision. Employee characteristics data may indicate to instructors a need for refocusing instruction on non-technical employment skills. Guidance personnel may also wish to use such data as input to the design of additional or revised guidance procedures. The employer ratings of the vocational students' training is a requirement under the emerging National Vocational Education Data Reporting and Accounting System (VEDS).

In the second approach, a general advisory committee can be a good source of suggestions and advice in the identification of potential data users. Such a committee should contain representatives from the major community groups which have a legitimate need for and interest in follow-up information. They can be given an overview of the types and uses of information to be obtained through student and employer follow-up, but caution is suggested in appealing for direct guidance. The purpose at this point is simply to identify potential users of the follow-up system. This in turn will facilitate setting

realistic goals and objectives and the development of a system which will best meet the needs of such users in a cost-effective manner.

Identify Data Needs, Purposes and Timing

When a maximum list of potential data users had been identified, it is suggested that a chart be prepared which lists users, their information needs, and when they need the information. The information needs of state and federal agencies are fairly well defined, but it may be necessary to spend time working with some of the other potential user groups to clarify and define their needs. Such clarification will also assist in determining priorities of user needs and data requests during later stages of the system design. It should be made clear, of course, that this is a preliminary needs assessment, not a promise to deliver.

As a general rule, a wider base of system users will promote greater support for the system and the logical time to begin to build such support is at the needs assessment point. A given piece of information may be useful to several groups if it is collected in the proper form and at the right time. The chart or classification of users by data needs by time frame should help identify overlap of needs and promote rational decisions as to what data should be collected. By beginning with a definition of generic data types, discussions with potential users can take place within reasonable boundaries.

Develop System Goals

The process to this point should provide a maximum list of agencies or groups which the follow-up may serve and a listing of their general information needs. These will serve as primary considerations in defining the goals of the system. There are more elaborate procedures for developing goals, notably those proposed by Lightfield (122) and Project Follow-up (243). Project Follow-up developed the TEX-SIS system and used the DELPHI methodology with a statewide group of raters representing primary user groups. As noted

earlier, many of the systems reviewed did not include stated goals, but to do so provides direction and assists in making key decisions later in the design process. Too many systems have been developed to provide only compliance data for reporting and evaulation, neglecting other equally important data uses. They not only face problems in adapting to new demans, but often underutilize the data which are collected.

Goals should be written to indicate the major purposes of the system but should not be tied to specific data items. As a general rule, three to five goals will adequately define the system's major purposes. Keeping in mind that no system can supply all the information everyone wants in the form in which they want it and when they want it, a preliminary assessment and setting of interim priorities of potential users and data needs should be made before settling on a final set of goals. At this point, however, a maximum set may be written. Cutting and refining the list should wait until after the next step, which is to develop a preliminary statement of objectives. The two are interrelated, each leading to further clarification of the other.

Specify System Objectives

Many spirited discussions have been held about the relationship of objectives and goals and the appropriate levels of specificity for each. For purposes of follow-up system design, objectives should serve to define each of the system goals in such a way that one can judge whether or not the objectives have been accomplished and in turn infer accomplishment of or progress toward the goals themselves. A goal is a major purpose; its accompanying objectives define more specifically the scope and content of the goal. As an example, a system goal may be "To provide information needed to complete local, state and federal reports." Accompanying objectives will further define this goal and make it operational and amenable to evaluation. Such objective might be: (1) to provide required information on the present educational status of program completers and leavers; (2) to

provide information on the occupational status of program completers and leavers; (3) to provide information on employer satisfaction with the vocational preparation of program completers.

In order to obtain maximum flexibility and adaptability in the system, objectives should not relate to specific data items. The number and type of such data items are sensitive to legal, cost and methodological constraints and are subject to frequent change. Availability of funds for the system will in all likelihood involve decisions at the level of specific data items, but at this point such specification is premature.

Objectives should be written for each goal. If it does not seem possible to specify one or more objectives under a given goal, that goal should be questioned. Such a process will reveal potential overlap among the goals or unanticipated goals. When the objectives are completed, the total list of goals and accompanying objectives should be reviewed in terms of the general physical and fiscal constraints which are known to exist. Detailed cost analysis is not possible at this point, but it is not too difficult to arrive at rough estimates of comparative costs between a system designed to serve an expansive set of goals and one capable of serving some but not all of the same goals. It may be necessary to arrange the goals in an order of priority and later select all that are possible and still keep the system within the limits of cost and other considerations.

Specify Reports to be Produced

Once a realistic set of goals and objectives have been determined and the user groups identified, the reports which may be generated should be listed. Again, cost or other constraints not yet adequately defined may force modification of this list. Such a listing, however, will help define the level at which data should be aggregated and provide some guidance in operational decisions later in the planning process. Actual report outlines will not be prepared until after defining the specific data items, but the nature of the reports and their general content should be specified at this point.

Develop System Timelines

Most, but not all, systems operate within an annual cycle tied to the school year, but at the same time must provide information to a variety of users with different time constraints. Some will be regulated by fiscal years, the calendar year, legislative calendars, budget schedules, or simply periodic demands. To some extent developing a general system time frame goes hand in hand with developing the system's potential goals, because these are often limited by the ability of the system to provide information on a timely basis. This does not mean that detailed scheduling of each activity should be undertaken early in the development of the system, but that timelines be identified within which the beginning and completion of major activities can be planned and pertinent deadlines established.

Determine Major Deadlines

These are often peculiar to the local situation, but the deadlines for reporting under the Education Amendments of 1976 (P.L. 94-482) are specified. The annual accountability report is due by July 1 of the year following a given school year. Beginning in 1980, the National Center for Education Statistics (NCES) plans to require that the completer/leaver follow-up be conducted in April of the year following program exit (Proposed VEDS Guidelines, 5/11/78). These will be key dates in the planning of any follow-up system which is intended to meet Federal reporting requirements. Local planners must also allow time for State personnel to compile, analyze, interpret and report the data which will be used in Federal reports.

Efforts must also be made to identify other deadlines which will affect or be affected by the operation of the follow-up system. The extent to which State and local agencies have their own reporting mandates should be investigated by planners of a follow-up effort. It can generally be assumed that every potential data user has a time frame within which data must be made available if they are to be useful. These deadlines should be examined for conflicts and compatability.

Conflicts may indicate a need to reexamine the extent to which certain data users' requests can be met. In some instances it may be possible to persuade potential users to modify either the data requested or the deadlines for delivery.

Occasionally planners may find that the follow-up is relatively unencumbered by reporting deadlines. When this is the case, the critical issue is the timing of the actual data collection, which in turn should be planned so that the information obtained is best able to answer the questions the follow-up is intended to address. Some of the problems related to the timing of data collection are discussed by the Southern Regional Education Board (197):

> Surveys that take place soon after graduation have the following disadvantages:
>
> 1. Graduates may not have settled into their first permanent job.
> 2. Graduates. . .may not. . .be able to make any judgement about the quality of their preparation.
> 3. Graduates' plans are still in a state of flux, so that actual outcomes are not yet available.
> 4. Graduates have not been away. . .long enough to permit a dispassionate evaluation of their. . . experiences.
>
> Surveys that take place very long after graduation have the following disadvantages:
>
> 1. Intervening developmental experiences may cloud the graduates' perspectives of how (their training) affected what has occurred by then.
> 2. Addresses become outdated the longer the interval from graduation.
> 3. Response rates drop as time between graduation and surveying increases.
> 4. Survey instruments must become more complex the longer the time interval between graduation and surveying since they must distinguish between various possible events occurring since graduation (e.g., first and subsequent educational experience, etc.). A survey instrument designed to collect information more than one year after graduation tends to elicit longitudinal information rather than information about what is happening to the graduate at one point in time (pp 16-17).

Develop Major Activities Timetable

After the major deadlines have been identified, a general timetable can be developed which should pinpoint the beginning and end of each major activity during planning and conducting the follow-up. It is not necessary that all tasks within these activities be scheduled. In many instances it may be impossible to do so. The purpose of developing the timetable is to identify overall time constraints and to avoid scheduling conflicts and inconsistencies. A good way to begin is to select the single most important deadline the system has to meet and work backwards. In this way the maximum amount of time for conducting the follow-up and each activity can be established, and all of the components and subactivities will have to fit into the schedule or be dropped. Planners should try to identify those activities which can be conducted concurrently, and to assign blocks of time to all major activity.

Upon completion of this process, the overall timetable should be reviewed, focusing on two specific questions:

1. Is it realistic to complete the follow-up effort in the time available and maintain reasonable cost, quality, and adaptability?
2. Can the follow-up be completed in less time and maintain reasonable standards?

General goals and objectives should now be re-examined in light of these questions. If it is unrealistic to expect the follow-up to be completed in the time available to achieve original goals and objectives, they may have to be reviewed and those of lowest priority eliminated. To do so is often difficult and sometimes impossible, but scheduling problems have to be resolved before the system design is completed or there would be no point in going ahead with it. Sometimes it is apparent that the follow-up can be completed in less than the maximum time available, and when this happens it may be possible to expand the number of user groups and requests for data. Earlier

completion of the follow-up should also be evaluated in terms of cost and effects on the quality and flexibility of the data.

Make Major Operational Decisions

Several major operational decisions must be made before the actual follow-up system can be designed and specific procedures identified: how to process the data; whether the follow-up should be conducted "in-house" or by a contractor; whether the system should be centralized, decentralized or partly decentralized; and whether data will be collected continuously or at regular intervals. While the overriding considerations of cost, quality and adaptability are most important in making these decisions, factors peculiar to the local situation must also be reviewed. Examples are: general characteristics of the population, reporting deadlines, present system components, and politics.

How to Process the Data

A major decision to be made is whether the data will be processed manually or by machine. Advantages and disadvantages can be found either way. Manual processing requires little equipment and may be relatively inexpensive. However, this is only possible when small amounts of data are to be processed. The disadvantages of manually processing data are that an extensive training program for staff is required, data processing is slow, and the potential error rate is high. When large volumes of data must be processed, the salaries of personnel required plus the cost of training and potential for error make this alternative less attractive.

The major potential advantages of machine processing are that large amounts of data can be processed quickly with a minimum of support personnel and a high degree of accuracy. This has potential for lowering overall costs, and when properly designed, machine processing also increases the adaptability of the follow-up system. On the other hand, cost reduction through machine processing depends on equipment

already being available and on its efficient use. Furthermore, machine processing assures high quality results only if well-trained personnel are available, programs are carefully written and tested, and data collection instruments are meticulously prepared. Generally, when small amounts of data are to be processed, manual processing is less expensive and can be just as accurate as machine processing. Large quantities of data are likely to cost less in the long run, result in more accurate data, and have greater adaptability when processed by computer.

Details that have to be considered when making this decision are the availability of equipment and technical staff, the number of people to be surveyed and the amount of data to be collected from each, and the kinds of information and analyses to be produced. Even if equipment is not available, machine processing should not be ruled out. One thing to keep in mind is the possibility of larger numbers and more data elements in years to come.

The kinds of information and analyses to be produced have a very important bearing on whether to use manual or machine processing, since manual processing virtually rules out all but simple tabulations of data. Numbers and percentages of students who complete certain programs or are employed compared to another group can be done by hand, but only at a high personnel cost and even then the probability of error is high. If the objectives are very specific and the follow-up is to be conducted only once, manual processing may be advantageous. Otherwise, machine processing should be seriously considered.

Investigate Possibility of Contracting

It is unwise for planners to overlook the possibility of having part or all of the follow-up conducted by another agency or private firm. A number of possible contractors might be considered. For example, colleges and universities have often conducted follow-ups for State and local agencies. Other State agencies may have the equipment and technical personnel to do it. Private consulting firms and research organizations may be available with equipment, personnel and

experience which would be difficult to equal. However, caution is advised in considering contracting with any organization, public or private, which does not have a well established record of performance in this area. Glowing promises and attractive brochures are no substitute for demonstrated experience, and there have been a number of costly failures from contracting with inexperienced or inadequately staffed outside organizations.

Actually, the follow-up has two major divisions, development and operation, and while both of these could be contracted it is probably not advisable to do so for development. A considerable amount of work has been done in designing existing systems and information about them is readily available in the literature. Moreover, since development includes a number of steps which can only be taken by the agency itself -- determining proposed objectives, for example -- to contract this part of the follow-up would be inefficient at least and probably self-defeating. That is not to say that some parts of system development should not be contracted or handled with consultant aid, but previous experience indicates that it is doubtful that a contractor can develop a suitable system from beginning to end or without considerable help from the contracting agency.

There are advantages, on the other hand, of contracting some or all of the operation of a follow-up after the developmental work has been done. Many agencies or firms have equipment and expertise not readily available to local school districts or State agencies. Using them has the potential for decreasing overall costs while increasing adaptability and expanding capabilities. Moreover, credibility is sometimes increased since specialists are performing the job. The most important consideration to keep in mind is whether the contracting organization actually does have the expertise and that this has been demonstrated through quality performance at reasonable cost for other agencies or school districts.

If the follow-up or any part of it is contracted, provisions should be made for supervision by the contracting agency. Requirements for liaison personnel should be an important consideration.

Without adequate liaison and supervision the contracting agency may find itself at the mercy of the contractor regarding such critical issues as cost, quality, and adaptability of the data. A related problem is that of return rate. Unless careful preparation is made, low return rates may result from former students not being familiar with the data collection agency. Many other factors must be considered when deciding whether any or all of the follow-up effort will be done by contract. Primary among these are legal constraints, the anticipated longevity of the follow-up effort, political considerations, in-house capabilities, and data security. These factors often must be considered in terms of how they affect each other. For example, should it be desirable to machine process the data but the equipment is not available "in-house," a reasonable alternative would be to contract the data processing phase. However, if it is expected that a follow-up effort will be conducted annually for the foreseeable future, it may be less expensive to purchase the necessary equipment, especially since the cost of equipment has been drastically reduced in recent years.

Centralized, Decentralized or Hybrid

Any given follow-up system may be operated as a totally centralized, a decentralized or as a hybrid system. A centralized system is one in which one central location and staff perform all the major follow-up activities. An example of this would be a Statewide follow-up in which schools are asked to supply certain enrollment and termination information to the central system which then carries out all the normal follow-up functions including preparation and dissemination of reports. A decentralized system is one in which each school or program within a school conducts its own follow-up. Any system which is somewhere between these two extremes is called a hybrid system. There are a number of State centralized systems, decentralized and hybrid systems. Some school districts operate centralized systems which serve all the schools in those districts, and frequently each local school conducts its own centralized follow-up for all programs in the

school. The definitions used are therefore not dependent upon the size of the effort but rather upon its organization. Whichever system is developed will depend to a considerable extent on the results of decisions reached in the two previous sections of this chapter.

The requirement for increasingly uniform data for Federal reporting may suggest State centralized systems, but the benefits of local operation of at least certain functions argue for decentralization. A compromise already operating in some States is the "hybrid" approach wherein there is centralized research and development, forms production, data analysis, and reporting, but with local agencies actually making the student and employer contacts. Two examples of this type of approach are the Minnesota Secondary School Follow-up System and the TEX-SIS system for community and junior colleges in Texas.

The Minnesota Secondary School system as described by Irwin and Copa (96) includes system development, instrument design and testing, procedural research, staff development and data analysis and reporting all being conducted by a central university staff. The actual mailing of questionnaires, telephone contacts and data coding are carried out by the participating local schools. An added advantage gained through this arrangement is that the local system can add its own questions to those on the standard follow-up forms. These and the core questions can both be analyzed and reported by the central staff. There are a number of advantages in such a system including involvement, potentially better return rates, and use of local clerical personnel for such tasks as mailing questionnaires and coding the data.

In the TEX-SIS system as developed by Project Follow-up (243), the Texas Education Agency contracted with Tarrant County Junior College to manage the developmental work. Most of the State's two-year colleges participated in the development at some stage, with several sub-contracting for components of the system. In operation, any institution may use one or more of the follow-up forms, questionnaire or procedures developed by the project. The coded questionnaires, data tapes or punched cards resulting from such use are then sent to the central system for processing, analysis and report

preparation. Local data are analyzed and returned to the originating institutions while State-required data are automatically pulled and aggregated across institutions. Local schools also have the option of using their own questionnaires and procedures rather than the ones developed by the system as long as data required for reporting and analysis meeting established standards of quality are obtained.

DESIGNING THE FOLLOW-UP SYSTEM

The goals and objectives, time constraints and major operational procedures of the proposed follow-up system describe the boundaries within which it must be designed to operate. After these are defined the actual design of the system can begin. There are four major steps: (1) define the population to be followed-up; (2) specify the data elements to be collected; (3) specify the study type, design and methods to be used; and (4) develop the necessary instrumentation.

Define the Population

To some extent the population being followed-up will be defined by the goals and objectives of the system, but it is necessary that it be defined in considerable detail. Exactly who is followed-up and the special characteristics of those individuals will have an affect on methodological decisions as well as the results. An example of the problems often encountered in deciding who will be followed-up is the definition of who is a vocational student. Controversy has surrounded this definition since the inception of Federal reporting requirements. Unless system planners pay careful attention to the establishment of specific operational definitions of the population, the quality of the data obtained will be suspect. Moreover, the outcomes of the follow-up are likely to be influenced, often in a negative manner. One of the best ways to define a population is to describe its relevant characteristics.

Determine Relevant Characteristics

VEDS requires that follow-up data be reported on students having certain characteristics, i.e. at the secondary level only those persons enrolled in 11th and 12th grade programs supported by public funds for which credit toward a high school diploma is given and which are designed to prepare them for employment in specific occupations. Post-secondary vocational students are those persons enrolled in

publicly supported vocational programs which terminate in Associate Degrees. Individuals in publicly supported vocational programs leading to certificates or licensure, in apprentice programs, or in programs not classifiable as secondary or post-secondary but are of at least 500 contact hours in length are reported as adult students. (Note: At the time this document was in preparation, VEDS was still undergoing modifications. Planners should refer to the latest VEDS materials.) This is an example of the type of specificity planners should attempt to achieve in defining the population.

There are a number of relevant characteristics which should be considered when describing the population. Which former students or employers will be included may be defined by such characteristics as the student's completion status, employment status, curriculum pursued, and exit date. Additionally, planners should consider several general characteristics of the population such as size, accessibility and dispersion. The description of the population not only provides information about who will be followed-up, but also provides information that is useful in determining what data should be collected and which data collection methods are likely to be most successful.

It is important that system planners thoroughly review the stated goals and objectives of the system before describing the population. For example, if one of the objectives is to investigate how youth perceive vocational education, it makes little sense to ask only vocational students. Students who chose the pre-college or general curriculum can probably provide information that will be more useful in assessing the image of vocational education than those who chose the vocational curriculum.

Identify Subgroups

There are two major reasons for defining subgroups within the population and their important characteristics. First is the importance such groups have upon methodological decisions. For example, if a substantial proportion of the population is academically handicapped, mailout questionnaires will have to be very carefully designed for low

reading level comprehension. Likewise, if the population includes a number of individuals whose primary language is other than English, a bilingual or multilingual questionnaire may be necessary.

A second reason for carefully identifying the subgroups is related to the goals and objectives of the follow-up. If one of the objectives of the effort is to determine how females who are trained in traditionally male occupations succeed in the job market, it is important to insure that information is obtained from an adequate number of females. If a sampling technique is to be used, it must be one which will insure such representation.

These are but examples of how research methodology and what data are collected are affected by the existence of subgroups within the population. Examples of groups that may be important are ethnic groups, handicapped or disadvantaged students, school drop-outs, under achievers, program or service area groups, males and females, students in each geographic region, and unemployed graduates. The extent to which any or all of these groups are represented in the population, combined with the desirability of being able to provide data regarding each group, determines the affect their existence has on methodological decisions. One thing to keep in mind, of course, is that maximum adaptability of the follow-up system is most easily achieved if the population is described in considerable detail.

Specify Data Requirements

There is always a temptation to sit down and start writing the questions or designing the form to be used in the follow-up, but this cannot begin until the data that are going to be required are specified. The system's goals and objectives provide the framework within which that identification process should take place. For example, if a system objective is to secure data for meeting the reporting requirements of VEDS, then an analysis of the VEDS requirements will elicit a number of data elements which must be included.

Identify Data Elements

A data element is a generic data category. A category or element such as employment status will normally include a number of more specific data items such as length of employment or unemployment, full or part time employment, why unemployed, relatedness of employment to training program and salary. The specific data items are the basis for actual instrument development.

At the most general level, two categories of data are evident -- (1) data acquired from students and/or their representatives and (2) data acquired from employers. Data elements which may be included under each of these broad classifications are:

From Students

- Present Employment Status
- Present Educational Status
- Employment History
- Employment Satisfaction
- Earnings
- Evaluation of Training
- Evaluation of School Services
- Recommendations to School

From Employers

- Employee Job Knowledge
- Employee Job Skills
- Employee Work Attitudes and Characteristics
- Employee Satisfactoriness
- Evaluation of Employee's Training/Preparation
- Recommendations to School/ Program

These are data elements which have been included in student and employer follow-up instruments. Any given system may have unique requirements beyond the elements listed or may collect less information than indicated by these lists.

Required data elements - Most systems are not designed to collect what is primarily "nice to know" information. The whole purpose of developing and operating a follow-up system is to provide required or "must know" information to decision makers at local, state, and

federal levels. The most pressing need at present is data to meet the requirements of VEDS. General information related to follow-up was mandated in the 1976 amendments, and the VEDS project was developed by the National Center for Education Statistics (NCES) to insure compliance with those mandates. The data which States must supply to NCES through VEDS include three general types: (1) Program Enrollment and Termination data, (2) Completer/Leaver Follow-up data and (3) Employer Follow-up data. Each of these in turn includes a number of data requirements. The following are requirements under VEDS (Communication from NCES, March 1979).

Program enrollment and termination data: Information is to be provided only for those programs covered by the State Plan. The reporting form is divided into three parts: Part A, provides information on occupational preparation enrollments and terminations who may be included in the follow-up; Part B, provides data on program enrollments and terminations for whom there will be no follow-up activity; and Part C, provides data on the instructional settings of handicapped enrollments.

Part A - provides information on six-digit OE code programs specifically designed for occupational preparation, 11th grade and above.

SECTION I	provides an unduplicated count of total instructional program enrollments during the reporting year
SECTION II	provides unduplicated total counts of program enrollments by racial/ethnic group by sex
SECTION III	provides unduplicated enrollment counts by program level
SECTION IV	provides enrollment data on Short-Term Adults
SECTION V	provides unduplicated counts for those enrollments with special needs--students classified as handicapped, of limited English proficiency, or disadvantaged

SECTION VI provides unduplicated counts of enrollments in cooperative vocational education

SECTION VII provides unduplicated counts of those students who complete, transfer from, or leave a program for any reason during the reporting year.

Part B - reports other occupational preparation and support programs not included in Part A. Separate reporting categories are provided for the following:

(1) Occupational Preparation: for persons below 11th grade enrolled in occupational preparation programs, persons at all levels enrolled in courses prerequisite to a six-digit OE code program, or a program or activity that leads to more than one six-digit OE code program

(2) Consumer and Homemaking (09.01) programs

(3) Industrial Arts programs

Sections I through V of Part B parallel Sections I through V of Part A.

Part C - "Enrollments of Handicapped by Type of Instructional Setting," provides unduplicated reporting of handicapped enrollments by instructional setting.

Completer/leaver follow-up: The Completer/Leaver Follow-up Report is divided into four parts. Part A describes the employment status of the follow-up sample by instructional program. Part B describes the employment status of the follow-up sample by racial/ethnic designation and sex. Part C describes the employment status of those individuals in the follow-up sample who are handicapped. Finally, Part D presents, for each program, the field of employment and average hourly salary of those individuals in the follow-up sample who were employed.

The classifications used for reporting Completers' and leavers' Employment Status are the following:

(1) Employed in a Field Related to Training (Civilian)
(2) Employed in a Field Related to Training (Military)
(3) Employed in a Field NOT Related to Training, NOT Pursuing Additional Education (Civilian)
(4) Employed in a Field NOT Related to Training, NOT Pursuing Additional Education (Military)
(5) Pursuing Additional Education (Employed in Field NOT Related to Training; NOT in Labor Force or Unemployed)
(6) Unemployed (Seeking Employment) and NOT Pursuing Additional Education
(7) NOT in Labor Force and NOT Pursuing Additional Education
(8) Status Unknown

The appropriate classification for a given individual is determined from his or her responses to the items on educational status, employment status, and relatedness.

Parts B and C are not required for the report to be submitted in November, 1980. (See instructions for NCES Forms 2404-5 and 2404-7).

Employer follow-up: Only employers of students who indicated they were employed in a field related to their training, civilian or military, are to be followed-up. States may design their own employer follow-up instrument but must as a minimum include verbatim the items in the VEDS form.

Employer follow-up data are to be summarized and related to (a) instructional programs, (b) racial/ethnic/sex designation and (c) program level and completion status. The required data include three basic areas:

1. Vocational Training Evaluation - the employer rates the employee's preparation in terms of technical knowledge, work attitudes and work quality
2. Overall Rating - the employer provides an overall rating of the employee's vocational training

3. Relative Preparation - the employer rates the employee's vocational preparation in relation to individuals in the same work group who did not have such training.

(For further information see instructions for NCES Forms 2404-6 and 2404-8)

Localities and/or States will generally identify additional elements which they consider to be necessary for adequate evaluation and/or planning. For example, systems which are designed to follow-up students from all curricula rather than just vocational education may need to have more detailed educational status information such as type of school, curriculum, etc. Data collected for program/evaluation/improvement may need to be more specific than that presently required under VEDS format. Figures 1 and 2 below are suggested formats for organizing the data elements of student and employer follow-up. Two levels of specificity are provided, but at the instrument development stage more than one data item may be required for a given element. The organization of Figures 1 and 2 is adapted from the Minnesota Post-secondary Follow-up System (170).

Figure 1. Potential Data Elements-Student Follow-Up

Data Category	Potential Data Elements
Educational Status	Type of education/training since program
	Amount of education/training since program
	Type of institution in which training received
	Primary educational objective
	Relationship of education to previous program

Figure 1 (continued)

Data Category	Potential Data Elements
Employment Status	Employed/unemployed/unavailable for employment Present job title/duties Full time/part time Relatedness of present job to training program Present employer/supervisor/address Reason(s) unemployment/unavailability for employment Reason(s) for unrelated employment Salary/wages, present job How present job was obtained
Work History	Advancement Number of jobs held since program exit Employers/supervisors/names/addresses Length of employment on present or previous jobs Relatedness to training program
Job Satisfaction	Satisfaction with salary/wages/benefits Satisfaction with specific job aspects Overall job satisfaction
Evaluation of Training Program	Overall rating of training program Evaluation of curriculum Evaluation of instruction Evaluation of facilities/equipment How well prepared for job

Figure 1 (continued)

Data Category	Potential Data Elements
Evaluation of Related School Services	Employment services Counseling services Related services
Other	Suggestions/recommendations related to program/school Evaluation of instruction in related area/basic skills

Figure 2. Potential Data Elements-Employer Follow-up*

Data Category	Potential Data Elements
Employee Work, Knowledge and Skills	Quality of work Quantity of work Job related knowledge Job related technical skills Ability to use tools and equipment on job Basic academic skills
Employee Work Habits, Attitudes and Characteristics	Acceptance of responsibility Punctuality Amount of supervision required Willingness to learn and improve Cooperation with co-workers Cooperation with supervisor/management Compliance with company policies, rules and practices Attendance

Figure 2 (continued)

Data Category	Potential Data Elements
Overall rating of employee	Rating of employee in relation to others in work group

*It should be noted that under VEDS the employer is asked to rate the training of the individual, not the individual who received the training. The assumption is that the employer can judge the quality of training by the performance of the employee. Under the elements proposed above (and used in a majority of present systems) the follow-up personnel have to make a decision as to the extent that the employee performance is attributable to the vocational program.

The above elements are those which were most commonly found in follow-up reports reviewed in the companion document to this guide. Any element actually selected should be justified under one or more of the system's objectives.

Additional data elements - The identification of additional needed data elements should begin with a reexamination of the system's goals and objectives. The goals/objectives section of this guide contained five general goal categories: (1) Compliance/Reporting, (2) Program Evaluation/Improvement, (3) Planning, (4) Research, and (5) Improvement of the follow-up. The elements listed in Figures 1 and 2 were synthesized from current follow-up manuals and reports and tend to emphasize the first three goal categories. Follow-up studies may, however, have one or more objectives related to research. Relationships between student characteristics, school performance or satisfaction may be investigated using student and/or employer follow-up data. Objectives related to assessment and improvement of the follow-up itself may require collection of additional data items.

Each potential data user's original request should be reviewed in relation to identified data elements. In most cases, a given element may serve more than one user. If there are user requests which are not satisfied by identified elements, these may be added to the list. Then, when all of the needed elements have been listed, the total list

should be reviewed for possible redundancies. Placing the elements in some order or priority may prove useful if the list is too long and cuts have to be made. If other agencies are also collecting follow-up information (e.g. specialized surveys by schools, the State Department of Education, etc.) from employers or employees, a review of their efforts should be made to identify possible overlapping of requests.

Specify Data Items

As a final step in the process of determining what data are to be collected, each data element should be further broken out into data items or actual pieces of information to be collected. The data elements help provide an organizational scheme for instrument construction, selection, or modification and the data items are the basis for actually writing the questions or phrasing the statements. Several of the elements listed earlier are broken out in Figure 3 to illustrate this process.

Figure 3. Potential Data Items

Category	Data Elements	Data Items
Job Satisfaction	Satisfaction with specific job aspects	Satisfaction with potential for advancement
		Satisfaction with supervision and management
		Satisfaction with co-workers
		Satisfaction with company policies and practices
		Satisfaction with pace of work
		Satisfaction with facilities and equipment on job
		Satisfaction with variety of work tasks

Figure 3 (continued)

Category	Data Elements	Data Items
		Satisfaction with safety conditions on job
		Satisfaction with job security
		Satisfaction with general working conditions
Evaluation of Training Program	Curriculum	Included skills required on job
		Included job related technical knowledge required on job
	Facilities and Equipment	Similarity of school laboratory to job
		Ease of adaptability to facilities and equipment on job
	Instruction	Quality of teaching
		Instructors' knowledge of subject
		Instructors' interest in student
		Currency of instruction
Evaluation of Related School Services	Employment	Career counseling
		Job placement
		Part-time placement while in school
	School and Personal	Financial assistance
		Personal counseling

Figure 3 (continued)

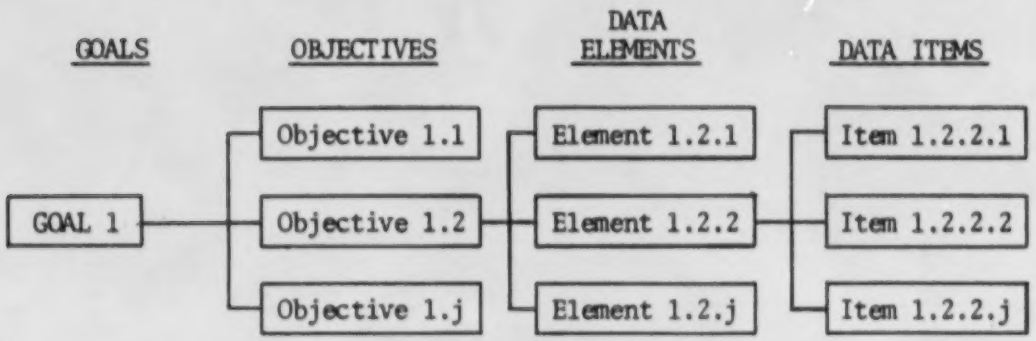
Category	Data Elements	Data Items
		Academic counseling
		Study, library, learning resources
		Recreation program
		Health services

The list of data items which may be developed can be quite extensive, and their delineation may reveal that too much information is being requested in terms of the effects it may have on cost and return rate. Again, the total list should be examined for overlap or redundancy, and an order of priorities of data items may help to eliminate some of the less critical ones.

Summary

The specification of data requirements has been presented as a rather lengthy and tedious process, but it is not so much tedious as systematic when carried out. The steps outlined above are most appropriate for development of a follow-up system from the ground up, but modification of existing systems may also be facilitated by carrying out the same steps from goal setting to specification of data items. Figure 4 depicts the recommended steps in the process.

Figure 4. Steps in Identifying Data Requirements



Specify Study Type, Design and Methods

The information necessary to make informed decisions regarding the type and design of the follow-up as well as the methods to be employed is developed through the process described in the preceding sections. This section deals with various options that are possible in terms of the type of follow-up that will be conducted, from whom data will be sought, how those individuals will be selected, and how the data will be gathered. To some extent, the objectives already specified will limit the options available. Thus not all of the options discussed here will be appropriate in every instance.

Determine type of Follow-up

There are four basic types of follow-up studies: one-shot, recurring, cross-sectional, and longitudinal. Additionally, it is possible to have a combination of two or more of these. The type of effort conducted is more often limited by the objectives of the follow-up than are the design of the study or methods to be used. Each type is especially effective in dealing with a particular set of objectives.

One-shot - In the one-shot type of follow-up a single collection of data is planned. Once the data are collected, analyzed, and interpreted, all objectives of the effort have been met and it is phased

out. This type of follow-up is especially effective for evaluating a new program or procedure, in determining the effects of an existing program on a special population, or in developing information needed to justify program revision, expansion or deletion. (65)

The major advantages of one-shot efforts result from the fact that the objectives of the study are both limited and very specific. Studies of this nature are generally inexpensive to conduct because large amounts of data are not sought. There is no need to develop systems for identifying respondents since the data files will not be up-dated. Thus data security and storage problems are minimal. It is often possible to process the data manually. The quality of the data is of primary concern. Cost is also a consideration but there is little need to be concerned about the adaptability of the system or the data.

The disadvantages of a one-shot follow-up are also largely a product of its specificity. It is impossible to identify or investigate trends or developing patterns. It is often more difficult to achieve high rates of return with one-shot efforts since little or no rapport is developed between subjects and those seeking information. The data produced only describe conditions as they exist when the data are collected. For this reason it is especially important that the quality of the data obtained be assured. Even though the data will be collected only once, a one-shot follow-up should never be undertaken casually or carelessly. Considerable time and money can be spent in its planning and design, and the data collected should be significant enough to warrant such an effort.

Recurring - The most common among existing follow-up systems, this type collects the same basic information from a different group of individuals at regular intervals, usually from former students each year at some specified length of time after they complete or leave their programs. A recurring follow-up is most often developed to supply information necessary for mandated reporting by State and Federal agencies. While the specific data required may change from

year to year, the basic kinds of data remain fairly constant. The extent to which system changes are necessary to meet these data requirement changes depends on the adaptability of the system, but the nature of the system can remain the same.

Recurring follow-up systems have some of the same advantages of the one-shot type. Cost of conducting the follow-up can be relatively low if the objectives are limited mainly to compliance reporting. Planning and designing costs are even more reasonable since they will be spread out over all of the years the system is in operation. Another advantage of the recurring over the one-shot follow-up is in the collection of data describing changes and trends, although a recurring follow-up can only produce descriptive data in this regard. Data storage and security are added considerations but they are not difficult since data files do not have to be updated. There is a problem in determining how long the data files should be stored, and this may have financial, legal, and policy implications. Two additional advantages of the recurring follow-up are that (1) over several years a rapport can be built with the student body and the community which will enhance chances for a high rate of return; and (2) it provides an opportunity for improving the data collection instrument with experience in its use. Major changes should, of course, be kept to a minimum in order to have comparable data from year to year.

One of the disadvantages of a recurring follow-up is in being unable to adapt it very easily to changing data requirement while still maintaining a reasonably efficient and economical system. Efforts to maximize adaptability may lead to seeking unreasonable amounts of data, which in turn often results in low quality data because of low return rates, and thus an inefficient system in terms of cost. The other extreme also occurs. Systems are sometimes developed which are low cost and produce quality data but are rigidly tied to a single set of data requirements. Such a system requires major revisions in order to respond to changing requirements. If changes are required, often the likelihood of year to year comparisons is greatly reduced.

For all practical purposes this is more like a series of annual one-shot efforts rather than a recurring follow-up system.

One additional characteristic of most recurring systems as compared to some one-shot efforts is that manual processing is generally not feasible. If the population or amount of data sought is quite small, a manual system may still be used, but it soon becomes an uneconomical operation. Machine processing is usually necessary for even a reasonable amount of adaptability and this may present financial considerations which in turn affect the scope of the effort.

Cross-sectional - A cross-sectional follow-up gathers data at one point in time from several categories of individuals included in a larger population. Thus an effort to concurrently obtain information from individuals one year after they complete or leave their programs and from another group which had been out three years would be of the cross-sectional type. Several such studies are identified in the companion document to this report, Follow-up Procedures: A National Review. Bibliographic entries 24, 53, 172 and 182 are examples.

The major advantage of a cross-sectional effort is that information is obtained at one point in time which can be useful in describing contrasts or explaining trends. It is the least expensive way of investigating developments or trends in terms of time and money. The use of cross-sectional data to explore time-ordered relationships must be done with caution, especially if respondents are asked to recall previous incidents. Also, it must be assumed that the conditions affecting individuals have remained constant for all categories of individuals followed-up. It is also possible to make cross-sectional type data analyses by comparing information collected during several years of a recurring follow-up.

Cross-sectional follow-ups while saving time and money have disadvantages. For one thing, comparability of the data is often questionable. Since they are collected from different groups, they may be comparable in some respects but not in others. The considerable effort required to obtain accurate addresses or telephone numbers for

those persons who have been out of the program longest increases cost. In areas having high mobility, it may be impossible to obtain that information and the quality of the data goes down. A lower response rate may result from the lack of opportunity to build rapport with subjects. This also has the effect of lowering the quality of the data or increasing the cost through special efforts to encourage response.

Longitudinal - A study in which data are collected at different points in time in order to study changes or explore time-ordered associations is longitudinal. Three types of longitudinal studies are commonly recognized: trend, cohort and panel. A panel longitudinal study is one in which the same individuals are followed-up at each data collection point. For purposes of the present discussion the terms panel longitudinal and longitudinal study are used synonymously. The longitudinal study which follows up the same individuals at one, three and five year points after program exit provides developmental data which can only be approximated by the cross-sectional study. The information gathered through such longitudinal surveys are most useful for describing and explaining developmental trends. In some instances it is possible to attribute some or all of the changes or trends to specific causes. Examples of longitudinal efforts are bibliographic entries 23, 68, 86, and 111. Relatively few longitudinal follow-ups of vocational students have been conducted.

Collecting data from the same group at regular intervals has three advantages over a cross-sectional effort. First, findings and conclusions are not based on any assumptions regarding the equivalence of different groups, because only one group is involved. Second, fewer problems are encountered in contacting subjects. Addresses or telephone numbers are up-dated on a regular basis, at least during each data collection effort. This reduces the attrition rate and lowers the possibility of non-response bias. Finally, data collection on a regular schedule builds rapport between the subjects and the follow-up staff. This also has the potential for increasing the

rate of return, and thus reducing the likelihood of non-response bias. The longitudinal type of follow-up undoubtedly provides the most valid and reliable data for investigating trends.

The major disadvantages of longitudinal follow-ups are the cost, time, and effort involved. They are expensive because data are collected over a period of time. If a sample is used, the size of the sample must be large enough to allow for accumulated attrition, and maintaining rapport with a large sample over an extended period requires additional effort. Also few results or benefits of a longitudinal effort are realized until after the second data collection has taken place, and this time lag between expenditures and results often makes it difficult to maintain adequate financial and personnel resources. This has probably been the major factor in limiting the number of longitudinal follow-ups that have been conducted. Finally, updating each respondent's file periodically requires linkages which can jeopardize the security of the files.

Combinations - It is possible to combine more than one type of follow-up and carry them out concurrently. Probably the most common combination is a one-shot with a recurring, usually when there is an interest in investigating a specific condition in depth. It has already been noted that an after-the-fact cross-sectional analysis of data is possible when a recurring follow-up gathers comparable data over a period of several years. In addition, a recurring type which collects data at more than one time after program exit makes analysis of the data possible as if the study were of the recurring, cross-sectional, or longitudinal type. These are merely examples of how the adaptability of a system can be increased by adequate planning and combining follow-up types.

Determine Follow-up Design

Two of the major options available when considering the design of the system are to collect data from all members of the population or to use a sample. If a sample is to be used, there are a number of ways

the sampling may be done. Final decisions are affected to some extent by the goals and objectives of the study, but the cost, quality and adaptability of the system as well as characteristics of the population are usually the critical factors. Most goals and objectives can be met by collecting data either from the entire population or from an appropriate sample.

Census - This is a follow-up that attempts to collect data from all members of the population, and this design has several advantages. Public relations may be strengthened by allowing all members of the population an opportunity to express themselves, and this is particularly true when the population is small or there are small subgroups within the population. Moreover, if one of the objectives is to provide feedback information to local schools or programs, census data are much more meaningful than data from a sample. If the entire population is small, there may be little difference in cost and effort between seeking data from the entire population and from a representative sample. Finally, there is also the matter of public acceptance. To many laymen data not gathered through a census are suspect, and this may include State legislators as well as citizen groups.

The disadvantages of the census are primarily associated with cost, but often quality as well. Following-up a large population is expensive because of printing, postage, telephoning, travel, recording the responses, and data processing. Manual processing is virtually impossible, which means leasing or purchasing computer equipment or paying someone else to process the data. Quality suffers if there is a low rate of response, and this sometimes happens when resources are inadequate to provide for prompts or additional contact attempts. The result may be an unreasonably high cost per useable return. Finally, a census of a large population virtually rules out interview methods of data collection, and these may be more effective than mail-out questionnaires.

Whatever the advantages or disadvantages, it is true that a majority of existing follow-up systems utilize a census design. The first

document of this series, Follow-Up Procedures: A National Review indicates that almost two-thirds of the existing systems are of this design.

Sampling - When less than the total population is to be surveyed, a sampling technique must be employed. In selecting the individuals to be included in the sample, the major concern is that the sample will be representative of the population. That is, the sample must have the same important characteristics as the population.

One important advantage of collecting information from a sample is that costs can often be reduced. However, as pointed out by the Southern Regional Education Board (197) the additional effort and cost of following a sampling procedure precisely must be taken into account. In some instances savings may be realized because manual processing of the data is feasible. It is often possible to seek more data and still obtain a higher response rate by surveying a sample rather than the entire population. This is because additional effort can be expended in instrument development and in encouraging returns. Thus "a high rate of return from a properly drawn random sample would provide infinitely more valid data than a total population survey which received a low rate of response." (31, p. 16). Follow-up surveys of the entire population have often resulted in relatively low rates of return (31).

Three major disadvantages are associated with sampling. First and foremost, unless the sample is properly selected it will not be representative of the population. If the population is small to begin with, a sample will have to include the vast majority of the population in order to be representative. In such a case, it is probably preferable, and may be no more costly to conduct a census. Finally, if one of the objectives of the follow-up is to provide feedback to programs or schools within a State, sampling may not be appropriate. This is because sampling, by its very nature, does not guarantee that an adequate number of subjects from each program or school are included.

Few of the reports reviewed during the course of developing the first document of this series used a sampling technique -- only about twenty-five percent in the case of student follow-ups and ten percent of the employer follow-ups. There are probably two major reasons for this in addition to the disadvantages of sampling cited above. Fear that the quality of the results will not be satisfactory and lack of knowledge about samples and how they are drawn. The following discussion of sample types should provide the general background information necessary to use samples wisely and correctly.

Simple Random Sample - This is a sample in which every individual in the population has an equal and independent chance of being included. Selecting the sample can be done in a number of ways. One is to write the name of every member of the population on a card and shuffle the cards. The required number of names are then drawn. (Sample size will be discussed later). When dealing with large populations a random number table is often used. This is a table mathematically designed to achieve the same results as shuffling but is much easier to use. Each member of the population is assigned a number, then starting anywhere in the table, select those individuals with numbers corresponding to the successive numbers in the table until the required sample size is achieved (Ott).

A simple random sample would be most appropriate when the population does not contain meaningful sub-groups. This is not to imply that a simple random sample cannot be used if the population does contain sub-groups. However, by using a simple random sample in such an instance the accuracy with which the sample represents the population is almost always reduced. Simple random samples were used for follow-up 31, 62, and 79 in the bibliography.

Stratified - There are two basic types of stratified sampling which have been used in follow-up studies: (1) stratified and (2) proportional stratified. A third type, optimum stratified, may be

appropriate but has not been generally used, probably because of its complexity.

If the population is composed of meaningful sub-groups, stratified sampling is appropriate. Meaningful sub-groups may be defined by such descriptors as ethnic/racial categories, school achievement levels, occupational categories, sex and others.

An equal stratified sample contains an equal number of persons randomly selected from each of the sub-groups which are called strata. All sub-groups are thus represented and comparisons between them may be made. For example, if one objective of the follow-up is to compare the job satisfaction of male and female graduates of business programs, an equal stratified sample would be appropriate. To generalize to the total population from which an equal stratified sample was drawn, the responses from each stratum must be weighted by the inverse of the probability of selection within that stratum. For example, if the sample size provides for a probability of selection of 1/5, the responses of that sample should be multiplied by five. Extensive discussion of how this is accomplished is readily available in many books which discuss sampling techniques. The reports included in the bibliography as entries 25 and 127 are examples of the use of equal stratified samples.

Equal stratified sampling is a special type of disproportional stratified sampling. In some cases it may be desirable to determine sample size from some sub-groups on some other basis: for example, a random sample of 100 subjects from any sub-group of more than 600 might be combined with the total number of subjects in any sub-group containing less than 100 to form a sample. At other times, one or more sub-groups may be of particular interest. In that case, planners may elect to "over-sample" from those sub-groups. Bibliographic entry number 30 is an example of this approach to sampling.

When a proportional stratified sample is used, the size of the sample drawn from each stratum is based on the representation of that sub-group in the total population. For example, if the total

population was 65 percent female and 35 percent male, 65 percent of the desired sample would be randomly drawn from the female sub-group.

A proportional stratified sampling technique is often more likely to represent accurately the population in terms of the sub-groups of which it is composed. It assures that all meaningful sub-groups are represented, and it assures that they are represented in the sample to the same extent as they are in the population. On the other hand, while it is often possible to make some comparisons among sub-groups with a sample of this kind, such comparisons are not as simple as with equal stratification.

The most important drawbacks of stratified sampling are in the classification of the population into strata. It can be very expensive to do this if lists are not already available. Errors in classifying subjects can also become a problem when the strata are not precisely defined. If the variables or characteristics used to determine strata are not related to follow-up responses, no gain in accuracy through stratification will be accomplished. Without accurate information regarding the composition of the population, it is virtually impossible to use proportional stratified sampling. Proportional stratification by service areas is probably the most common use of this procedure. Examples are found in entries 39 and 127 in the bibliography.

Systematic - This is a sampling technique which resembles a simple random sample, but may not result in a truly random selection. In order to draw a sample using a systematic approach it is necessary to develop a complete list of the population. The desired sample size is divided into the number of individuals in the total population. This quotient represents the increment by which subjects will be selected. If for example a sample of 100 was desired from a population of 555, every fifth individual on the list would be included in the sample. The selection process is begun at a random place in the list and returns to the beginning of the list if the desired sample size is not achieved when the end of the list is reached. The extent to which a

systematic sample approximates a simple random sample is determined by the extent to which the list is random. If the list is randomly compiled a good approximation is obtained.

The major advantage in using a systematic sample is the ease with which it can be selected. There is a disadvantage, however, in the likelihood of a biased sample being drawn if the population list is based on any orderly sequence, for example alphabetical. Systematic sampling was used in the follow-ups listed as bibliographic entry numbers 1, 189, and 223.

Cluster - This is the least used of the more common sampling procedures discussed in this document. It is based on the random selection of groups of subjects rather than on individual subjects. For example, a school district might choose to select at random entire classes for follow-up rather than randomly selecting students from all classes throughout the district. There are two basic reasons for using cluster sampling. First, it may be difficult to develop a list of all members of the population, a requirement in each of the previous sampling techniques. Second, if one of the objectives of the follow-up is to compare different institutional practices, it is often impossible to do so with a random selection of individuals. As an example, comparing a placement service which includes a post-placement interview with one that does not, when such a practice would be established on a school-wide basis, would be easier using a sample of randomly selected schools rather than individual students.

Cluster sampling has two advantages when it can be used. It is only necessary to develop a list of those individuals who are included in the selected groups. It also provides useful data about each of the groups selected. This is an advantage if one objective of the follow-up is to provide such information to teachers or administrators. The major disadvantage is that this procedure has a lower probability of resulting in an accurate sample of the population than those previously discussed. While no existing follow-up systems were identified in which a true cluster sample was used, reports 9 and 10 in the

bibliography approximate this procedure. A slightly modified cluster sample is the only sampling technique allowed by VEDS in State follow-up reporting. As few as twenty percent of the school districts may be followed-up each year in an annual rotation so that all school districts are followed up every five years. However, the sample should be selected in such a manner that it is roughly representative of the total state population. The purpose is to reduce the cost of follow-up while maintaining adequate representation of the population.

Combination - It is possible, and sometimes desirable, to use a combination of census and sampling in a follow-up. This approach might be taken to reduce costs and still provide useful data to at least a portion of programs or schools cooperating in the follow-up effort. As an example, all graduates of one or more service area programs might be followed-up each year, while a sample could be selected from the remaining program areas. By rotating the census among the service areas, each is provided useful information periodically. This is not a reasonable alternative if a major objective of the effort is to develop a complete data base for annual planning at lower administrative levels. Several follow-up systems have used this approach, i.e. bibliographic entry numbers 39, 223, and 225. A random sample has also been used in conjunction with a census to demonstrate the validity of a random sample for the purpose of modifying follow-up procedures (31).

Determining Sample Size

What constitutes an adequate size sample has been the subject of much controversy. It is difficult to specify in numerical terms the exact relationship between the size of the sample and the size of the population which would be appropriate in every instance. There are factors peculiar to each situation which have to be considered. Mauly (242) points out that no simple answer exists. However, "a sample should be relatively 'large,' not because a large sample is good in

itself but rather because it gives randomness a chance to operate" (p. 141).

Major Issues - How large a sample should be depends on a number of factors. Above all, it is necessary that the sample be large enough to be representative of the population. Thus a smaller sample would be required to represent a homogenious population than would be required to represent a population which is highly heterogeneous.

Sample size is also affected by the refinement of the measuring instrument being used as well as what is being measured. Smaller samples can be used when the measuring instrument has been proven to be valid and reliable than when instruments of questionable or unproven quality are employed. For example, the average height of sixth graders could be more accurately determined by using a measuring tape graduated in sixteenths of an inch increments than one graduated in quarter-inch increments. Theoretically, if enough sixth graders were measured with the less precise rule the size of the sample would tend to overcome the lack of precision of the instrument. It stands to reason that there are practical limitations to how much imprecision can be nullified by sample size. A related issue is what is being measured. Students' height can be measured more accurately than can their IQ. Thus a larger sample would be required to determine sixth graders' average IQ than their average height.

Another consideration affecting the size of the sample is the sampling procedure to be used. Generally, it is necessary to use a larger sample if a stratified sampling procedure is used than when a simple random sample is used. This is especially true when one objective of the effort is to make comparisons among the various sub-groups. The key factor here is the size of the sample necessary from each of the sub-groups to insure each is adequately represented. Not only the quality but the adaptability of follow-up data will be compromised if sub-groups are inadequately sampled.

In the final analysis, the decision about sample size is usually made by weighing how much precision is desired or required against the

cost of obtaining that precision. Common sense plays a large role in this determination. It is unlikely that some error in estimating the starting pay of program graduates would have as profound an effect on program continuation as would error in estimating the extent to which program graduates are entering a field related to their training. Unreasonable requirements for precision drive up the cost of the follow-up.

Having said that, however, it is necessary to emphasize that precision, quality, and adaptability are all directly related, and to sacrifice one is to sacrifice all three. A second point to be emphasized is that "sample size is much more important than what percent it is of the population. A ten percent sample of ten is meaningless; a ten percent sample of 100,000 is wasteful." (65, p. 69). This point is underscored by Mauly (242) in stating that the precision of the data is more a function of the size of the sample than of the percentage of the population included in the sample.

Several procedures can be used to determine sample size. An expert on sampling could be employed to compute the size necessary for any desired level of precision. It could be computed on the basis of the cost of contacting and processing information from each individual in any given sample. A review of literature would provide insight into the size of samples which have been used by others in a similar situation. However, probably the most economical and convenient procedure is to refer to one of the several published tables for selecting sample size. Figure 5 illustrates the importance of sample size as opposed to percentage of the population (65, p. 71).

The use of a table has two distinct advantages over reviewing the literature or determining sample size solely on the basis of cost. First, a reasonable estimate of precision is provided by the table. Second, it may provide an appropriate sample without the staff time and cost involved in determining and justifying a sample independently. This is especially true for those agencies not having a sampling expert on the staff or readily available. It should still be remembered that the estimates of precision associated with the

Figure 5. TABLE FOR SELECTING SAMPLE SIZE[1]

If your population is of size	and you want to guarantee* that your sample percent reflects your population percent within									then you should use a sample of size
	±1%	±2%	±3%	±4%	±5%	±6%	±7%	±8%	±9%	±10%
100	99	97	92	86	80	73	67	61	55	49
150	148	142	132	121	108	97	85	76	67	59
200	196	185	169	151	132	115	99	86	75	65
250	244	227	203	177	152	130	110	94	81	70
300	291	267	235	201	169	142	119	101	85	73
350	338	306	264	222	184	152	126	106	89	76
400	385	343	291	241	196	161	132	110	92	78
450	430	379	317	258	208	168	137	113	94	80
500	476	414	341	273	218	174	141	116	96	81
600	565	481	385	301	235	185	148	121	100	83
700	653	542	423	324	249	194	154	124	102	85
800	739	601	458	343	260	201	158	127	104	86
900	823	655	489	361	270	206	161	129	105	87
1000	906	706	517	376	278	211	164	131	106	88
1200	1067	801	565	401	292	219	169	134	108	89
1400	1222	885	606	421	302	225	172	136	110	90
1600	1372	961	641	437	310	229	175	138	111	91
1800	1516	1029	670	451	317	233	177	139	112	92
2000	1656	1092	696	462	323	236	179	140	112	92
2500	1984	1225	748	485	333	242	182	142	114	93
3000	2286	1334	788	501	341	245	184	143	115	94
3500	2566	1425	818	513	347	248	186	144	115	94
4000	2824	1501	843	522	351	251	187	145	116	94
4500	3065	1566	863	530	354	252	188	146	116	95
5000	3289	1623	880	536	357	254	189	146	116	95
6000	3693	1715	906	546	362	256	190	147	117	95
7000	4049	1788	926	553	365	257	191	147	117	95
8000	4365	1847	942	559	367	259	192	148	117	95
9000	4647	1896	954	563	369	260	192	148	118	96
10000	4900	1937	965	567	370	260	193	148	118	96
15000	5856	2070	997	578	375	263	194	149	118	96
20000	6489	2144	1014	583	377	264	195	149	118	96
25000	6939	2191	1024	587	379	264	195	150	119	96
Infinitely large	9604	2401	1067	600	384	267	196	150	119	96

For example, if you have a population of 5,000 people and you want the sample percent to be within 4% of the true population value, you should use a sample size 536.

* odds 19 to 1

[1]Reproduced with permission from Student Accountability Model Operations Handbook (71)

particular sample sizes are still affected by other factors, such as the reliability and validity of the measurement instrument and the rate of return.

Determine Data Collection Methods

To some extent data collection methods are affected by and must be considered simultaneously with the question of whether to use a sample and how large it should be. The objectives of the follow-up and the number of persons to be contacted may impose limitations on which methods can be used while maintaining reasonable cost. A variety of methods and combinations of methods are available. The decision of which method or what combination to use should be made by examining the local situation and requirements in view of the characteristics of each of the options. There are three basic methods which can be used to collect follow-up data: the mail-out questionnaire; telephone interview; and personal interview. In addition, each of these may be supported through the use of two techniques, prompts and incentives, to encourage returns.

Mail-Out Questionnaire - This is the method most commonly used, and while it may be expensive and time-consuming, these costs are relatively small when prorated over a large number of contacts. Since many individuals and agencies have developed and are using questionnaires, there is a considerable amount of information in the literature that can help reduce development costs. Many individuals feel more comfortable with mail-out questionnaires than with other methods of data collection because of their frequency of use. It is a convenient and economical way of collecting information from large numbers of individuals, particularly when the follow-up population is widely dispersed. The use of a questionnaire also guarantees that all subjects are asked the same questions in the same way.

On the other hand, mail-out questionnaires are not uniformly satisfactory and may present many disadvantages. For one thing, they have a history of low to moderate rates of return. There have been

questionnaires which produced high return rates, but unless they are carefully constructed with considerable attention to detail in both content and the way they are used, low returns are almost inevitable.

Because of their popularity and the fact that many people feel comfortable with mail-out questionnaires, there is often a feeling that anyone can put one together in a reasonably short time. That much is true, but the reliability of information obtained through the use of amateur questionnaires is doubtful. The professional skill with which such documents are prepared has a major effect on the rate of return, reliability and validity of the data, adaptability, and cost. Questions may be misunderstood, misinterpreted, provoke hostility, or otherwise lead to bad information unless they are organized and expressed with considerable skill. If it is necessary to change the questionnaire on a regular basis to meet changing requirements for data, the economic advantages of this method may be greatly reduced. The use of mail-out questionnaires obviously has attractions or it would not be the predominate method of collecting follow-up data, but it is equally capable of producing good or bad results depending on the care and professional skill that go into its preparation.

Telephone Interview - Follow-up information has been collected by telephone interview, but rather infrequently. The first document in this series notes that it is the method least used for the initial data collection attempt, but increases in popularity with second and third attempts. It has the advantage of a measure of personal contact not possible when a questionnaire is used, which may be one of the reasons for the relatively high rate of response commonly reported when this method is used. Questions can be clarified when misunderstandings arise, although some care must be taken in this regard to avoid leading or suggesting responses. Telephone interviews can be conducted from a central location, and it is sometimes possible to obtain more information or at least more in-depth information through the interviewing technique. This may be especially true when following-up persons with special characteristics such as those who are bilingual, disadvantaged or handicapped.

There are limitations in telephone interviewing as a method of obtaining follow-up information, however. When individuals being followed-up live outside the local area, telephone costs can be prohibitive. The feasibility of telephone interviewing is also reduced if a large number of individuals must be contacted, if for no other reason than the amount of staff time required to complete the interviews. In general, telephone interviews serve the purpose of a follow-up reasonably well when a sample or a small population is being surveyed, or when an extremely limited amount of information is sought from a moderate number of persons.

Planners and system designers should be aware of two additional factors which may affect the results obtained through a telephone interview. Identical questions must be asked of each person interviewed, and asked in the same way. Changes in the way a question is asked or even different inflections in the voice, may cause individuals to respond differently to some items. For this reason it is important that an interview script be developed and used, that questions be anticipated and uniform explanations developed, and that interviewers receive some training before they begin the survey. Secondly, it is possible that individuals will respond more favorably to questions asked in a telephone interview than when those same questions appear on a questionnaire. Although there is some uncertainty about this, it may result from the loss of a feeling of privacy and anonimity on the part of respondents.

Personal Interview - The review of current follow-up practices revealed that personal interviews are a more popular method than telephone interviews only for the first attempt to collect data. As additional data collection attempts are made, the personal interview is used less frequently. It was used exclusively in approximately five percent of the data collection surveys reviewed.

The personal interview provides more personal contact than the other two major methods. As with the telephone interview, questions can be clarified and studies which have used this method have generally

reported very high response rates. High response rates may be the result of personal contact. Another possible advantage is that if the interviews of employed persons are conducted at the job site, additional information can be obtained. For example, the employer might be interviewed at the same time or some evaluation of the job site might be made.

On the other hand, the disadvantages of telephone interviewing are also true of personal interviews, but to an even greater extent. The number of persons who can be contacted is extremely limited and can only include those residing in a small area. Results may be favorably biased because of the personal contact involved. Interviewers also may influence respondents through leading or prompting.

Techniques for Increasing Response Rates

A variety of techniques have been used to increase response rates in follow-up surveys, some of them quite successfully. When questionnaires are equally capable of eliciting information, experience shows that any of the four kinds of techniques discussed here can increase the rate of response. It should also be noted that, while these techniques would appear to be useful only with mail-out questionnaires, that is not the case. Many of them can be used just as successfully with interviews, and this has been done in a number of cases.

Prompts - A prompt is any device, technique, or effort which has as its purpose encouraging a response, reminding persons to respond, stimulating interest, getting attention, or publicizing a need to respond. Many types of prompts have been used. Those encountered most frequently include a cover letter explaining the purpose of the study, post-card or telephone reminders, pre-addressed and postage-paid return envelopes, individually signed cover letters, and questionnaires printed on colored paper. Prompts which have been less frequently used include publicity in the local news media, personal salutations on cover letters, captions such as "Now It's Your Turn" or

"Important: Your Attention Requested" printed on questionnaires or envelopes, and the use of colorful wildlife or commemorative stamps on return envelopes. The variety of prompts that can be used is limited only by imagination and budget. The effectiveness of the more commonly used prompts has been documented. How effective others may be which are unique or less frequently used is uncertain, but perhaps the best place to go for ideas is to product or market research. Any prompting technique used in consumer research has probably been tested and found successful.

Incentives - It is sometimes difficult to distinguish between prompts and incentives, but incentives are usually some tangible form of reward for providing information. They are of two basic types, unconditional and conditional. Unconditional incentives are those given to all persons contacted, and are usually included with the questionnaire or with the request for an interview appointment. The intent of unconditional incentives is to gain cooperation by developing a feeling of indebtedness on the part of those who receive them. Examples of unconditional incentives often used are a pencil, a packet of coffee, a keychain, and small amounts of money.

Conditional incentives on the other hand are promised upon return of the questionnaire or completion of the interview. They have an advantage over the unconditional type, since they can only be received upon responding to the request for information. To be effective, however, they must be of greater value, either perceived or actual, than unconditional incentives. Raffle tickets, substantial monetary rewards, a copy of the results, or a newsletter about members of the population have been used as conditional incentives.

Building Rapport - The amount of rapport that exists between the agency conducting the follow-up and the subjects can have an affect on response rate. People are often more willing to respond to requests from agencies or individuals with whom they are familiar. Two procedures have been used to build rapport -- orientation prior to program exit, and communications after program exit.

Orientation before leaving the program usually covers either the purposes of the follow-up effort, the instruments used or both. In most cases it is a brief discussion by the instructor or a member of the follow-up staff just before students leave the program. Such basic points are discussed as what the information will be used for, why it is important to respond, approximately when the information will be collected, and what types of information will be requested.

Communicating with individuals to build rapport without actually attempting to collect information is a less frequently used procedure. The most common example is sending a pre-notice of the survey, i.e. a post-card or letter telling subjects that they will be contacted in the near future. Such novel ideas such as sending birthday or holiday greeting cards have been used with success. As noted earlier, rapport is less of a problem for systems the longer they are in operation. Students seem to expect to be contacted after leaving the program if this has been a standard procedure for some time.

Timing and Number of Attempts

The problems involved in locating individuals who have been out of the program for some time as well as the problems of collecting follow-up information too soon after program exit, have already been discussed. There are other timing considerations which should also be noted. If a questionnaire is used, experience has shown that a better response rate is achieved if they are received on Tuesday, Wednesday or Thursday. Mailings around major holidays such as Thanksgiving, Christmas, or Easter may also increase the possibility that the individuals to whom they are sent will receive them, especially those continuing their education (197). However, some problems can be encountered because of the large amount of mail individuals receive around such holidays. Additionally, questionnaires received on either the 15th or 30th of the month may be ignored since these are times when bills are usually received and paid (99). Requests for information should be timed so that subjects can respond conveniently.

Response rates can always be increased by multiple attempts to collect information, and this is the usual practice in questionnaire surveys. Of the follow-ups reviewed, few made more than three attempts to collect information, however approximately two-thirds of them made at least two attempts. Two or three contact attempts are usually recommended. After the third attempt, the cost of the additional information obtained becomes too high for most purposes, especially if response to the previous attempts was fairly good.

When mail-out questionnaires are used, it is important to plan the timing of second and third mailings. Normally this ranges from two to three weeks, but it depends on whether the individuals being followed-up are widely scattered or reside in the local community, and also the accuracy of address information. The important thing is to allow enough time for delivery and return through the mails and a reasonable period for filling out questionnaire.

The Data Collection Plan

It is important that the entire data collection effort be a planned operation. As an example, it might be scheduled as follows:

Day 1 - Mail pre-notices to all persons being followed-up.

Day 10 - First mailing of questionnaire and cover letter; include keychain, raffle ticket and stamped return envelope.

Day 24 - Mail post-card prompt.

Day 31 - Second mailing of questionnaire with cover letter and written prompt.

Day 45 - Prompt by telephone. Emphasize the need to return the questionnaire in order to be eligible for the raffle.

Day 52 - Cease data collection

This simply illustrates the nature of the planning suggested and is offered only as an example. Regardless of the methods and techniques used, the purpose is to obtain data of the highest quality from the largest number of subjects while maintaining reasonable costs.

The extent to which prompts, incentives and multiple data collections can be used will depend on the availability of staff and financial resources. It is usually better to do a few things well than to try to do too many and do them poorly.

Non-respondent Survey

Non-respondents are those from whom no information is received during the normal planned data collection sequence. A non-respondent check or survey is conducted to determine if non-respondents as a group differ systematically from those members of the population who did respond. If non-respondents differ from respondents the data collected do not accurately represent the population and their use is seriously impaired. Unfortunately, surveys of non-respondents are not often conducted, and in most cases where they have been the results have shown important differences between the characteristics of respondents and non-respondents.

Anytime a response rate of less than 100 percent is obtained, there is a possibility of non-response bias, and this increases as the rate of response declines. It is advisable to make a spot-check for bias whenever the response rate is less than 100 percent but higher than eighty percent. When it is less than eighty percent, a non-respondent survey should be made. Non-respondent surveys can provide useful information in addition to that contained in the questionnaire, e.g. insight into who did not respond and why. This is useful knowledge for improving a follow-up system.

There are three basic ways to make a spot-check for bias. One is to select several important questions from the questionnaire and conduct a telephone interview of a number of non-respondents selected at random. These answers can then be compared to the answers of the respondent group by using appropriate statistical procedures. A more thorough explanation of this process can be found in bibliographic entry 64. A similar procedure which takes a practical, rather than statistical, approach to determining whether differences exist is described in document number 218. However, it should be noted that

the latter approach can only be used if the questions in the spot-check have only two possible answers.

A second procedure that has been used frequently is to compare the characteristics of the respondents with the characteristics of the population or of the non-respondent group. In either case the characteristics used for comparisons should be those which might reasonably result in a response bias. These include sex, ethnic/racial background, employment status, in-school achievement, and socio-economic background, although there can be many others. It is usually quite simple to compare respondents to the total population, but the validity of this comparison is based on the assumption that data about the population are available and accurate. If not, or if the data are so general that they fail to identify small but important sub-groups, the existence of a response bias cannot be determined that way. It is safer, although more expensive, to compare the characteristics of the respondents with the non-respondents, and in order to do this data must be collected about the non-respondents. In some cases it may be possible to obtain these data from existing files, e.g. school records. Usually, however, it is necessary to conduct a short survey of non-respondents.

A third procedure is to compare the responses of early respondents with those of late respondents. The underlying assumption is that late respondents' answers will more closely resemble the answers of non-respondents. While this may be true in specific instances it is a questionable assumption.

Regardless of which of these procedures is used to spot-check for response bias, if differences are found the data collected can not be assumed to accurately represent the population. If the data are used, this fact should be made quite clear when interpreting and reporting results.

Should a response rate of less than eighty percent be achieved, the spot-check procedures previously described are not adequate. In such an instance it is advisable to conduct a non-respondent survey. This requires that decisions such as whether to conduct a census or

sample survey of non-respondents, what data collection methods to use, and whether the original or a shortened version of the questionnaire should be used must be made. The non-respondent survey is conducted according to the data collection plan that results from those decisions. The data are compared to those obtained from original respondents and a decision made about the extent to which bias exists.

Develop Instrumentation

Instrumentation for the follow-up may take the form of a mail-out questionnaire, a telephone interview guide, an in-person interview script or some combination of these approaches. The extent to which the system achieves its goals and objectives is highly dependent on the adequacy of the instrumentation used, its length, the way questions are phrased, and the ease of recording responses. With decisions made as to what information is to be collected and how, instrument development becomes primarily a process of item construction and determination of layout and format. Since the vast majority of follow-up efforts do use mail-out questionnaires as the primary data collection method, this guide will place emphasis on questionnaire development. Many of the principles of questionnaire design, however, also apply to telephone and personal interview scripts.

Review Available Instruments

Although the title of this section may imply construction of an instrument from the ground up, the process may be more accurately described as "assembling" than construction. Instrumentation for the follow-up of vocational students and/or their employers has been developed in numerous previous studies and offers a wide range of content, styles, and formats. The companion to this guide describes 54 student and 19 employer follow-up instruments, many of them the result of considerable time and thought invested in item construction, instrument format and layout. It is doubtful if any one of them can be used intact by another agency, but a careful examination

of available instruments should be a first step in the development process.

Reviewed instruments included simple postcards, self addressed instrument/envelope combinations, elaborate multiple page instruments with professional graphics, a telephone interview script and others. Some were directly machine readable (optical scan), some could be keypunched directly without extensive coding and some required extensive interpretation by system staff prior to coding. Existing instruments can best be reviewed in a systematic way through the following steps:

1. Request instruments from as many follow-up systems/studies as feasible which appear to be similar in scope and characteristics to the system being developed. Many of the instruments are available in materials in the ERIC system but some will need to be requested from the authors or the agencies using them. Some instruments are copyrighted, but it is not advisable at this early stage in the review to request permission to use all or part of a copyrighted instrument. The companion document, Follow-up Procedures: A National Review, will be helpful in locating instruments currently in use.
2. Develop either a large wall chart or loose leaf notebook for assembling potential items. If a wall chart format is used, data items which were previously derived from the system goals and objectives should be grouped by data element and their corresponding data items. As instruments are reviewed, promising items can be transferred to the chart or notebook. These may not be in the desired format, but that can be taken care of later.
3. During the review process, ideas for overall instrument design, graphics and organization should be noted. Instruments ranging from simple typewritten mimeographed sheets to cartoon illustrated professionally printed documents are available.

Prepare Actual Questions and Items

Having completed the review of instruments and collection of sample items and layout format ideas, the actual process of instrument construction can begin. This consists of writing the first draft of items and questions to be included. In some cases, the review of instruments may not have yielded samples or ideas and these must be developed independently. In other cases, identified items may be modified or incorporated as is. Common courtesy, not to mention copyright laws, dictates that in the actual use of intact items or sections of instruments permission should be obtained from the originating author or agency.

There are basic rules of instrument construction and item design which apply to follow-up instrumentation. Many of these principles are described in basic texts on educational measurement. The following were suggested by Gold (65).

- Design the instrument to require the minimum possible time to complete.
- Use as few words as possible in asking the questions.
- Use familiar words, don't abbreviate, avoid long expressions.
- Use two simple questions rather than one complex one.
- Avoid hints as to desirable or expected answers.
- Phrase questions to avoid academically or socially acceptable responses.
- Place easiest to answer questions near the beginning.
- Sequence questions to conform with respondent's way of thinking.
- Plan method of tabulating results during questionnaire preparation.
- Consider using double postcard for brief questionnaire.
- Observe parallelism and exclusiveness in multiple-choice questions.
- Make directions brief but complete and set off with distinctive lettering.
- Don't ask a question unless it clearly relates to the purpose of the study.
- Give prime consideration in designing the questionnaire to motivating its return, secondary consideration to data processing requirements.

- If deemed necessary, assure respondent that names will not be used in any published reports; however, most researchers agree that anonymity is not critical in response rates and it is advisable to be able to make a second contact with non-respondents, thus requiring some kind of identification.
- Use different color questionnaires for groups you want to study separately (p. 28).

Typical questionnaire items consist of a stem and some form of response options including completely open response, multiple choice, alternative categories, yes-no and Likert-type scales of forced-choice. As items are written, several overriding principles should be kept in mind. The first is that above all else the respondent must be able to understand what is being asked. Teachers who have attempted to defend some of their "best" discriminating test items to a grade conscious class have some feeling as to the importance of the principle of clarity.

Second, even if an item reliably collects the correct data, the data must be in a form amenable to the planned analysis or the item is questionable. Therefore, the question of how the data will be analyzed must be posed for each item or group of items. For example, if an item is developed to collect categorical salary data (the respondent is asked to check the range within which his/her salary falls) average salaries cannot be calculated. In many cases, the frequency or percent of respondents falling within prescribed categories is the desired information. It should be kept in mind, however, that if actual salary were collected, several analysis procedures may be employed including categorization. Increased flexibility in analysis can be achieved by designing items to collect data at the highest useful level. Commonly accepted levels of data are nominal (categorical), ordinal (rankings), interval (score data with an arbitrary zero and equal intervals) and ratio (an absolute zero with equal intervals).

Third, economy of respondent time and instrument space should be an ever-present consideration. In many cases, a single stem may serve several data items. As an example, an item from the Minnesota Post Secondary Follow-up instrument (170) requests the respondent's evaluation of related school services:

How would you rate the quality of the following services as provided by the area vocational technical institute? If you did not take advantage of the service, or if the service was not available, check "does not apply" (Please check only one square for each item.)

	Excellent	Good	Poor	Does not apply
1. Job Placement	☐	☐	☐	☐
2. Counseling with personal problems.....	☐	☐	☐	☐
3. Help in making career decisions	☐	☐	☐	☐
4. Help in securing part time employment	☐	☐	☐	☐
5. Help in obtaining financial assistance..	☐	☐	☐	☐
6. Help in securing housing...	☐	☐	☐	☐
7. Youth Organizations.....	☐	☐	☐	☐
8. Recreation Programs.....	☐	☐	☐	☐
9. Study, library, and other learning resource facilities	☐	☐	☐	☐
10. Health Services.....	☐	☐	☐	☐

Design Instrument Format

Once actual items have been written, the layout of the overall instrument may be developed. Three considerations are: logical order, respondent classification, and instrument appearance. Logical order indicates that one should ascertain employment status before asking how much the respondent makes or how satisfied she/he is with present employment. A general principle of test development is that an instrument should progress from the easiest to the most difficult items. This is often not possible in follow-up instrumentation. Logical order should be from the point of view of the respondent, not the follow-up goals or data analysis plan.

Second, consideration of who should answer a given item or group of items will often suggest or dictate organization. Many "Not Applicable" responses can be avoided, the respondent can be saved a lot of time, and the probability of response increased by judicious item placement. If there are several items which pertain only to presently unemployed graduates, those items should be grouped and presently employed graduates can be guided around them by the design of the instrument. Care should be exercised in making such decisions, however. Comparisons between various sub-groups within the follow-up population may not be possible if arbitrary decisions are made that certain groups' answers would not be as valuable as others. Program

"drop-outs" or leavers is an example of an often omitted group that could provide useful evaluative information.

Thirdly, instrument appearance is important. The instrument should not look crowded or "busy." Directions should be set off by using a different type style or size or by enclosing them in a box, brackets, or shaded area. Consideration should be given to having the instrument typeset and professionally printed rather than simply typed with standard pica or elite type. Several researchers have found that colored paper results in a higher return rate. While consideration of ease of coding is important, it is more important that the questions and directions are easily understood.

Select Appropriate and Alternative Analysis Methods

Once the basic instrument is developed, it should be reviewed in terms of data analysis strategies. While data level was one of the considerations during item development, actual analyses should now be specified to make sure that the items will in fact answer the questions posed. Those items which are specifically designed to supply reporting information in terms of frequencies or percentages will not generally present analysis problems. If a purpose of the follow-up however, is to determine relationships or differences between subgroups of respondents, attention must be given to all items which contribute data to any particular analysis. Alternative analysis strategies should be considered in the event that response rates or other problems make the originally planned analysis inadvisable.

Typically, follow-up reports have used only frequencies, percentages and, in some cases, means to summarize findings. If system goals and objectives have been restricted to descriptive reporting, such analyses are generally appropriate. Unfortunately, however, often there has been little interpretation of even these analyses, leaving the burden of interpreting the findings to the various readers. Vocational educators may be under-utilizing the potential of student and employer follow-up through neglect of careful interpretation of findings.

A follow-up can not only reveal strengths and weaknesses but also explore potential reasons why they exist. This is seldom done, as indicated by the very small number of research-type objectives found during the review. Relationships may be examined through cross-tabulation of variables or in some cases correlational techniques. Questions such as the following can be addressed:

> Is there a relationship between students' evaluation of training programs and their employment status?
>
> Is job satisfaction related to the extent to which students are employed in occupations related to their training program?
>
> Is length of time in the training program related to salary or employers' ratings of worker satisfactoriness?

Although such questions can be asked "post-hoc" or after the follow-up is conducted and the reports written, they may often help in the interpretation of the study findings. The best guarantee that the data will permit analyses such as these is through proper instrument and analysis design.

Prepare Additional Documents

A number of documents are required in addition to the actual student or employer instruments, including cover letters, reminder letters or cards, and pre-notices. They are primarily "prompts" intended to encourage the former student or the employer to respond. It has been found that return rates are higher if the cover letter is signed by the teacher, counselor or principal at the local school level than by someone unknown to the subject. Non-respondents have often stated that the main reason for not responding was failure to see the value or necessity of the follow-up. For this reason it is important that pre-notices or cover letters state clearly and concisely the reasons for the follow-up and why a response is important. All communications with subjects should be professional in appearance but also personal to the extent possible. Communications with employers should be concise and require a minimum of employer or supervisor time.

The Cover Letter - Response rate may be more dependent upon the cover letter than on the questionnaire itself. A good cover letter should have several characteristics. The letter should: (1) clearly state the reasons for the study, (2) stress the importance of a timely response, (3) be straightforward and not make grandiose promises or claims, (4) ideally carry the original signature of someone known to the individual, (5) be as short as possible and (6) be printed rather than mimeographed. The cover letter is actually a document of persuasion. It should encourage a timely response to the questionnaire but should not be too strongly worded. A "hard-sell" will probably be rejected by many potential respondents.

On the second mailing, the original cover letter may be used along with an additional memo or a new cover letter may be developed. This second contact should mention the first mailing and re-emphasize the importance of a response. This letter or memo should also allow for the possibility that the student or employer may already have provided the requested information.

Pre-notice - A few studies have used some form of pre-notification that in a few days the student or employer will receive a follow-up questionnaire. Such a pre-notice can impress subjects both with the importance of the study and of responding promptly. There is little evidence to indicate that the additional cost involved in this procedure is justifiable. However, it may be if a small sample or population is being surveyed.

Reminders - In addition to or in lieu of a complete second or third mailing, some form of reminder may be used, including reminder cards, letters or telephone calls. Such attempts should assume the tone that the former student or employer had intended to return the questionnaire but had forgotten to do so. It should reaffirm the importance of the study and the individual's contribution to that study. In the case of a telephone reminder, a standard script should

be used. The purpose of a telephone prompt is to encourage response, not to collect data.

Evaluate and Refine Instruments

Since data derived from student and employer follow-ups are used to make important decisions in vocational education, the quality of such data is critical and has been stressed throughout this guide. Data quality is related to and dependent on many factors, of which instrument reliability and validity are paramount. Validity is the extent to which data accurately reflect program outcomes, or more specifically the extent to which the follow-up instrument accurately measures what it is supposed to measure. Reliability is the consistency with which the instrument measures whatever it measures. A reliable instrument should provide the same answers when repeatedly given to the same people if their conditions have remained constant. For example, if a student reports different degrees of job relatedness to training on two occasions when in fact he or she has not changed jobs, one may begin to wonder whether or not the question was really understood.

Classical test theory and instrument design references provide methodological and procedural guidelines for assessing instrument reliability. Due to the unique nature of follow-up data and instrumentation, this guide does not advocate traditional test-retest or internal consistency reliability measures. The procedures advocated below stresses the maximization rather than just assessment of reliability and validity.

Factors Which Affect Reliability and Validity - When a student or employer responds to a follow-up item, the response may be affected by a number of factors. Using a traditional achievement test as an example, the score a student receives is made up of two components -- the student's true ability and errors of measurement. These errors of measurement may be classified under two types -- constant or "biasing" errors, and random errors. Any aspects of the items which systematically

bias the response detract from validity while both constant and random errors detract from reliability. The designer or operator of a follow-up system must strive to eliminate those features of the instruments and procedures which lead to both types of errors.

Obviously, if a student cannot read the questions or understand the directions, quality data will not be obtained. Generally the situation is not so clear-cut however, and is more nearly one of misunderstanding some directions and/or some items or even some words or phrases. It is doubtful that traditional reading level checks are of much use since they do not identify trouble spots for possible revision. For example, if an item simply asks for the student's present salary, answers will probably include hourly rate, weekly income or even annual earnings. Some will be before and some after deductions, some will include overtime, some will not, and so on. Some students who realize that a number of alternatives are possible may be frustrated by the question and not answer it at all or add a note of clarification. Perhaps this is an extreme example but many such items were found in reviewing follow-up instruments. Other problems which may reduce reliability and/or validity are:

- Use of words or technical terms not in the respondent's vocabulary
- Failure to allow for language problems of bilingual populations
- Questions which may be perceived as threatening or too revealing
- Ambiguous questions
- Questions with categorical response options which overlap or are not exhaustive
- Questions which lead the respondent
- Questions which have obviously "socially preferred" responses
- Use of jargon in questions or instructions
- Questionnaires which are so long as to promote careless responding in the latter sections
- Lengthy or complex directions
- Failure to group items logically
- Asking for too much information with one item

- "Double-barreled questions" (these can usually be spotted because they contain the conjunction "and")
- Negative items or double negative items
- Use of "value-loaded" terms when not necessary

Other factors such as response rate and sampling affect data quality also, but the actual instrument is of critical importance. A number of procedures may be employed to maximize the quality of the instrument and thus of the data derived.

Review by Content and/or Instrument Design Specialist - Some of the persons who participated in the goals/objectives and data element definition may be asked to review the instrument in terms of whether or not it adequately addresses the objectives of the follow-up. The extent to which the included items appear to measure what needs to be measured as well as coverage of the objectives should be the primary concerns of the reviewers. Also, review by one or more instrument design specialists may reveal specific shortcomings or design flaws that can be remedied prior to pilot testing.

Pilot Test - Both a pilot test and a pilot study will probably improve the instrument considerably. It is doubtful, however, unless the instrument is to be used with large populations or repeatedly over a period of time that the time and expense of conducting both procedures is justified. The pilot test is less demanding in terms of both time and participants and should be considered a minimum developmental requirement. After review by specialists, the draft instrument should be administered to a small group of twenty or more. The participants in the pilot test should be as nearly like the target population as possible but do not need to be sampled from or proportionally representative of that population. Current students who represent the broadest possible spectrum of abilities, and of cultural and economic backgrounds may be used. The instrument may be administered and then discussed in a group setting, or individuals may respond and then be interviewed. Pilot-test participants should be asked to respond to

the instrument as though they had already left the program and to mark anything which they find difficult. Either the group discussion which follows or the individual interviews should provide valuable information for revision of the draft instrument.

A somewhat different approach to the pilot test which has sometimes been used is to mail the draft questionnaire to a small sample of the target population. As soon as a response is received, the respondent is asked to answer questions about the questionnaire. The questions are designed to obtain the same kind of critique that is obtained through the procedure described above.

Pilot Study - A pilot study involves actual use of the follow-up instrument with a representative sample of the target population. The main difference between a pilot study and the actual study is one of size. A pilot study should as nearly as possible replicate the procedures to be used in the actual study. Some researchers will use alternate forms of certain questions or use alternate instruments with sub-samples in a pilot study in order to make judgement about different formats. A pilot study enables one to try out system procedures and instrumentation but does not typically provide the basic instrument improvement data that the simpler pilot test procedure does.

Traditional Reliability Tests - If a follow-up instrument is likely to be used over a period of time and with large samples, a modified test-retest type of reliability assessment may be desirable. One example of such an assessment is described by Pucel and Luftig (171). Since overall instrument reliability is relatively uninformative and may actually be misleading, the reliability of individual items or clusters of items should be checked. Traditional correlational measures are probably not suitable and other methods such as chi square analysis may not be sensitive enough to provide needed information.

In summary, although procedures exist for formal assessment of reliability, the unique nature of follow-up instrumentation indicates that careful review, field testing and revision seem to be most appropriate for instrument improvement.

Eliminate Sterotyping and Bias in Communications

All communications, instruments and reports of the follow-up system should be developed and reviewed to eliminate age, ethnic and sex stereotyping. There is a history of language usage and convention which runs counter to present guidelines and which makes it difficult to develop non-stereotypic materials without organized and deliberate effort. Internal guidelines and checksheets should be used to monitor practices in this area but an external review of all materials by a person with expertise in the area is also recommended.

There is still some debate on how to achieve fairness in communication but a number of recent publications should be helpful. Among these are:

- Job Title Revisions to Eliminate Sex and Age Referent Language for the Dictionary of Occupational Titles (U.S. Department of Labor, 1975)
- Guidelines for Sex-Fair Vocational Education Materials (U.S. Office of Education, Bureau of Occupational and Adult Education, 1978)
- Guidelines to Ensure Sex Fairness in Education Division Communications (Women on Words and Images, Inc., for the National Advisory Council on Women's Educational Programs, 1978)

Several general guidelines seem to be well accepted and may serve as an internal guide as materials are being prepared.

- Use of a disclaimer to justify consistant use of male referents is not considered to be sex-free communication.
- Use language that encompases both sexes, interchange order and avoid stereotypic association of one sex with any given occupation.
- Use approved neutral occupational titles.
- When names are used as examples in questionnaires, reports or other materials, use common names from various ethnic groups.

- When values, lifestyles, socioeconomic status or ethnicity are indicated, depict a variety, not just those of the writer or predominant group in the area.

Staff development in the area of fair communications may be necessary. The guidelines by Women on Words and Images, Inc. are comprehensive and are an example of materials which may be used in staff development. No comparable materials for dealing with age and ethnic fair communication were located.

OPERATING, DOCUMENTING AND EVALUATING THE SYSTEM

Collect and Analyze Data

Prepare for Data Collection

Prior to the actual start-up of the data collection cycle, an overall record keeping/data management system should be developed. Such a system is necessary to keep accurate records of those who have responded, when responses were received, and when succeeding contact attempts were made. Future analysis of response trends or differences depends on accurate documentation of the data, as do overall accountability and evaluation of the follow-up. Oversights or duplication in mailing questionnaires or in coding reduce the quality of the data, add cost, and damage public relations. Data security during this process must, of course, be maintained for both legal and ethical reasons.

An overall data/records management system ordinarily has three main sub-systems: (1) record keeping, (2) data coding and documentation, and (3) data storage.

Design record keeping system - The record keeping system should provide documentation of attempted contacts, provide a convenient and accurate way of triggering additional contact attempts according to a pre-determined data collection plan, and should record the identity of respondents and time of response. The system should be capable of providing current information during the follow-up on total returns and on the response status of particular former students or their employers. In the case of employer follow-ups which are designed to secure the former student's permission before contacting the employer, the record system should trigger the employer contact attempt when permission is received. Since most follow-up studies guarantee that data will not be identifiable with the particular student or employer, the record keeping system should use numeric codes keyed to name lists which are kept separately under proper security. As few as possible

of the staff should have access to the coding system and name lists.

In a continuous-flow follow-up in which former students are contacted throughout the year at a predetermined time after leaving the program, the record system may be automated. An annual follow-up can also be automated, but it may be more feasible to use a series of manual recording forms.

Design coding and documentation procedures - The actual design of the follow-up instrumentation dictates to some extent how responses must be processed. Instruments may range from optical scan forms for direct input to data storage and processing to forms which require extensive manual coding and/or interpretation. Instruments have been used which are designed for keypunching directly from the instrument and a number have been developed which require only a minimum of interpretation and coding prior to processing. Some systems have been designed in such a way that coding and documentation tasks can be performed by clerical staff with a minimum of training.

Follow-up systems which do not use machine processing will generally use data coding sheets specifically designed to facilitate manual data processing. Whatever system is developed would have two design goals: maximum efficiency and accuracy. Efforts to achieve both of these goals may be appreciated when it is realized that a follow-up instrument may contain as many as fifty or more separate items of information, each of which may be multiplied by thousands of returns.

While efficiency (cost) and accuracy (quality) of the coding processes are primary concerns, a third consideration is flexibility. The way data are coded can limit the kinds of analyses that are possible. As a general rule, items of information should be coded numerically rather than alphabetically. Names of schools, cities, programs and other similar information can be converted into numeric codes. These are often pre-printed on the instrument itself, but in any case should become part of the system's documentation in a separate record for data storage and retrieval.

Follow-up systems which use machine processing and analysis of data may or may not possess the expertise within their own staff to develop the actual system components. If external personnel are to be used, they should be involved in coding and documentation decisions as early as the finalization of instruments. Early technology in data processing, on which almost all existing follow-up systems are based, have required the use of specialized programs and routines developed for each individual study. More recent technology has made possible the use of highly flexible programming which allows the user to obtain large numbers of analyses without specialized programming other than for unique functions such as editing and merging of files.

If data are coded so that each piece of information from each respondent is identifiable, most analyses are relatively simple. If a code is used, for example, which contains a unique number for each respondent, the respondent's zip code, school, and training program, it is then possible to generate summary data by geographic area, for schools and for programs. It is also possible to examine other desired combinations or subsections of the data. A statewide system may then have the capability of providing summary data on any program across the total State, on that same program within geographic areas of interest, or even on each such program within each school in the State. A local system which gathers data on all its programs can report information on each program or across programs.

Complete data processing manuals have been published for several systems (see for example Reference 244), which may be adaptable to other systems. As a general rule, however, some specialized coding and/or analysis procedures will probably be needed in any new follow-up system. Again, any system which is developed should guarantee the security and accuracy of all data as well as permit present and future identification of any individual data item.

Plan for data storage - This part of the operation may not at first appear to be much of a problem, but questions of security, redundant storage and the length of time data are to be maintained

must be considered. Anyone who has had a master tape "dumped" or erased appreciates the necessity of either having a back-up file or the ability to re-create the lost file at a reasonable cost. Completed instruments should at least be maintained until accuracy of coding and documentation procedures are tested. As a rule nothing should be destroyed that cannot be located in another place or cannot be re-created. The possibilities of fire, theft, vandalism or loss justify the need for redundant data storage. In manual systems, a carbon can be used to create a second copy with little additional effort or cost. Machine processing permits rapid copying of cards, tape, or disk files to a back-up file. Duplicate data sets should, of course, be stored at separate locations. Machine processing such as merging files, correcting entries or adding data always presents the possibility of destroying data through a programming error. For this reason, such processing should be made on an operating file with the master or back-up file kept in reserve.

Prepare and print forms - Basic operational forms such as instruments, cover letters, post card prompts and others are discussed in a previous section of this guide. These, as well as internal data recording forms, record-keeping forms and others should be developed and printed prior to the actual start of the data collection cycle. All external communications should be carefully edited and proofs of those which are to be printed should be carefully examined prior to actual quantity printing.

Plan and conduct training and orientation - As Gold and Morris (64) point out, researchers consistently find that preparation of students while still in school provides significant increases in terms of response rates, completeness and accuracy of responses. Similar efforts with faculty and staff as well as parents, civic groups, employers and labor organizations may also help, although research is lacking as to how such preparation can be accomplished and still remain cost-effective.

All faculty or staff working with the students who will be followed-up should be informed about the system. A positive attitude on the part of teachers and administrators can contribute significantly to positive student attitudes, so any investment in faculty orientation and materials is well worth the effort. It also helps to alleviate faculty concerns that the follow-up is primarily an evaluation of their performance. Orientations should include the purposes of the system, exactly what data are to be collected and how data are to be summarized and used. The positive potential of follow-up data for demonstrating program success as well as for program improvement should be emphasized. When faculty will be conducting the student orientation they should be adequately prepared for the task and be supplied with sample forms, orientation booklet, visuals or other materials which will assist them.

Students should be told about the follow-up while they are still in the program; it is difficult if not impossible after they have left school. They should have an opportunity to ask questions, discuss the benefits of follow-up both to themselves and to future students and even become familiar with the actual questionnaire, interview script or other methods to be used. Results of previous follow-up studies can be shared with students still in school to demonstrate how the collective data rather than individual responses are reported and used by the school or State. Results of employer surveys are also useful, since they are often positive and encouraging to future program completers. An orientation of this kind will tend to assure students of the authenticity of the actual follow-up contact when they receive it.

When the follow-up system uses enrollment data obtained directly from the student while in school, orientation to the follow-up may be conducted at that time. A short review just prior to program termination should then be added to serve as a reminder and to reinforce the cooperative attitude previously encouraged.

Understanding and support for follow-up efforts can be increased by working with groups external to the school system. Such groups include civic organizations, employee and labor organizations and

parent groups. A slide-tape presentation or other printed or media materials may prove useful. Again, an attractive hand-out brochure could be made available at such presentations. Public service spot announcements or presentation time on radio or television is made available at no cost to non-profit organizations in many communities. Such mass media approaches may be well worth the time and effort required in terms of their potential effect on response rates and data accuracy and reliability.

Collect Data

The initial phase of data collection is to obtain information necessary in order to contact the former students. As pointed out in the companion document of this set, that information is usually gathered before students leave the program. It may not be possible, but it is certainly much easier to obtain accurate information at that time. Sometimes it is possible to collect such data during the follow-up orientation, if not during the enrollment process. If it is simply not possible to collect the contact information before students leave the program, it may be possible to do so from school files, although to do it that way is generally laborious and time consuming. It should also be kept in mind that the development of accurate contact information becomes increasingly difficult as the time between program exit and follow-up increases. If a sampling procedure rather than a census survey is used, it is from the total list that the sample is drawn according to the procedures outlined previously.

The most efficient way to organize any data collection operation is to build into it at least two on-going activities by the staff. These have been mentioned before but they are important enough to reemphasize. One is the recording of information which indicates who has responded and when. This is essential. The other is data coding or recording. Unless the number of former students being surveyed is very small, coding or recording of the data is a major task. It is time consuming and it can also be quite boring, especially if post-poned until all data are collected. In order to keep errors at a

minimum and make the best use of staff time it is usually a good idea to plan the coding in between other activities as data are being collected.

After the data collection sequence is completed, the response rate should be evaluated. When a mail-out questionnaire is used, the generally accepted procedure for computing response rate is to subtract the number of questionnaires returned as undeliverable, for any reason, from the total number of individuals with whom contact was attempted and divide the resulting sub-total into the number of usable responses received. In computing the response rate associated with the use of an interview procedure a similar procedure is used. The number of individuals who could not be located after repeated attempts is subtracted from the total number of individuals with whom an attempt was made to set up an interview and the resulting sub-total is divided into the number of individuals with whom interviews were actually conducted. In either case, the answer obtained, expressed as a percentage is the response rate of the data collection effort.

It is often useful to monitor the response rate during the data collection sequence. For example, by knowing the response rate at the end of each major phase, it may be possible to predict whether an extensive non-respondent survey or merely a spot-check for bias will be required. Of course, the actual decision must be based on final results and within the guidelines and plans developed when the system was designed.

Analyze Data

Edit and validate data - Before analyzing the data, it is necessary that they be edited and validated. Whether manual or machine processing is used, the procedure is basically the same. First the data values as coded or recorded should be spot-checked against answers indicated on the questionnaire or interview form. In the case of manual processing this is done visually. When data are keypunched on cards, they can be checked by using a verifying machine. When optical

scanning equipment is used, data records can be listed and visually spot-checked.

The second step is to compare data values to specified legal value ranges that have been established for each data item. The intent of this process is not to establish whether the item is accurately coded or recorded but to insure that appropriate codes have been used. For example, a data item indicating the sex of the respondent would most likely be limited to three possibilities, male, female, or omitted. If numeric values of 1, 2, and 3 were assigned to those possible answers, that item would be edited to ensure that no zeros or values greater than three are included as codes for the data item, sex. It should be apparent that editing of this nature will not identify coding or recording errors such as a male being coded as a female.

A third possible step is sometimes feasible. Summary information can be compared against known characteristics of the respondent group. If, for instance, it was known that the respondent group included exactly 200 females, the data item sex could be summarized to determine if 200 respondents were coded as females. Again, however, the fact that the numbers are the same is not a complete guarantee against coding or recording errors.

Develop data files - Before the data file can actually be developed, two preliminary steps should be accomplished. A data file format should be planned. This format describes where data items will be located within the data file. Factors such as cost, efficiency, access, and system compatability must be considered. If expertise and experience in developing data files are not available among staff members, consultation with outside experts may be helpful. This is especially true if the data file being developed is large, complex or will be up-dated at a later time.

If there are data items which should be recoded prior to analysis, it may be advantageous to do the recoding as the data file is developed. For example, the number five (5) may represent a highly favorable response to some items but represent a highly unfavorable response

to other items. It may facilitate the analysis of the data to recode such items so that all favorable responses are coded in the same direction.

One other factor that should be considered when coding the data is how missing data will be handled. Generally, missing data are assigned some code. However, there is a temptation to use a blank to indicate missing data. This may present problems during the analysis of the data if machine processing is used. Some computer programs interpret a blank as zero, while in some cases zero and a blank may be a different answer. Also, if the instrument includes response options such as "do not wish to respond" or "does not apply," these are not the same as missing data and should not be coded or interpreted as such.

In some cases, it may be necessary to merge two or more data files to develop the master file. This would occur when in-school or employer data are to be merged with the follow-up data from former students. When data files are merged, the resulting master file should be edited to insure that information has not been deleted, to identify any errors that may have occurred in the transfer or recoding of data, and to ascertain that the file follows the planned data format. Finally, a duplicate of the master file should be made. As noted earlier, such a procedure can save a great deal of time, money and effort if the original is lost or damaged.

Conduct analyses - Although the general format of intended reports was considered during development of the follow-up instrument, a detailed outline for each report should be developed prior to analyzing the data. Each report should be outlined in terms of the specific data and analysis procedures which are available and necessary. These outlines indicate data needed and analyses to be made in order to meet the objectives of each report. It may be that additional or alternative analyses will be identified during the process. Major factors to be considered are the purpose of the report, who will use it, and the type of information to be included.

Data can be analyzed essentially in three different ways: (1) to describe or summarize, (2) to investigate or define relationships, or (3) to investigate or define differences. The nature of the question to be answered determines the kind of analysis to be made. The possibility of answering a question in a particular way depends on the kind of data available. This second point was discussed in the section on instrument development. If something has been overlooked or a mistake made when the instrument was being developed, it is too late to do anything about that after the data are collected. It is possible, on the other hand, to satisfy additional requests for information or to conduct additional analyses after the instrument has been developed if care has been used in the way data are requested.

Analytical questions about the nature or characteristics of a particular group may be answered by using summary statistics. For example, "How many graduates are employed?" could be answered in several ways, some more informative than others. The verbal answers, "Quite a few" or "A majority are employed" provide little useful information. Likewise, the answer "642 are employed" is not very informative without knowing what this represents out of the total group. If the answer is "82 percent are employed" the employment rate is known, not merely a quantity unrelated to anything else. Statistics most frequently used to describe a group in terms of its dominant characteristics are:

- the mean (average)
- the median (the point that divides the population or group in half)
- the mode (the most frequent answer)
- simple counts, sums or percentages
- range

The objective in using these statistics is to provide the most information in the least space and do it without distorting the truth.

Questions about the relationships among characteristics or events can also be answered in several ways. The question, "What is the relationship between program completion and full-time employment?"

could be answered by comparing the full-time employment rate of program completers with non-completers, or by using a statistic that measures strength of association. An example of the first is "75 percent of the program completers are employed full-time, while only 50 percent of the non-completers are employed full-time." This answer describes the employment rate of two different groups, program completers and non-completers, and [illegible]es a relationship by comparing them. On the other hand, a computed correlation coefficient, .83 for example, describes the strength of the relationship between program completion and full-time employment. While the correlation coefficient provides a more accurate answer to the question, its usefulness depends on the statistical sophistication of the reader. There are actually many ways of measuring the strength of relationship statistically. The particular circumstances under which any given technique would be appropriate can be determined by referring to statistics texts or by consulting a statistician.

It is also necessary at times to know the extent of differences between groups. For example, "How much does the beginning weekly salary of program completers differ from the beginning weekly salary of non-completers?" It is possible to answer the question by merely stating the average beginning weekly salaries for both groups. In the case of data from samples, however, this procedure does not reveal whether a difference actually exists, or is the result of expected variations in the samples. To find the answer to that question, a t-test may be used. Differences between groups can be examined through other statistical methods also, and again the best source of information regarding which statistical options are appropriate is either a book on statistics or a statistician. In any case, the final decision as to whether any existing differences are large enough to be important must be made by those interpreting the results of the data analysis.

One question that must be answered during the data analysis is whether those individuals responding to the survey differ from those who did not. If no response bias is found, the use of inferential

statistical analyses with data from a random sample is justified and results can be generalized to the population. However, if significant and important differences between respondents and non-respondents are found, the utility of statistics is limited since results cannot be generalized. Likewise, when non-response bias has been identified in a census survey, the results cannot be presented in such a way as to imply that they describe the total population.

In the end, it is the use of common sense by those in charge of the data analysis that will ensure the use of appropriate procedures. Inappropriate or unnecessarily complicated statistical methodology is known as statistical "overkill," and examples are only too prevalent. To use such procedures when a simple analysis answers the question often violates one or more of the assumptions upon which such statistics are based or exceeds the limitations of the data. It also violates a very important principle of data analysis -- to provide the maximum amount of useful information to the reader in the least confusing way.

Prepare Reports and Documentation

Prepare Reports

The usefulness of follow-up results and the way they are used depend largely on the type and quality of the reports produced and disseminated. Since various user groups may have unique data needs, separate reports targeted to their particular needs may be advisable. Assuming data required to meet their needs were built in during the design of the system, the production of multiple reports is not an insurmountable task. Probably no other one component of the follow-up has as much potential for affecting acceptance, future funding, and expansion or revision of the system as does the report or reports which are produced.

The most common users of follow-up data are the Federal government, State agencies, local school boards, State and local advisory committees, administrators and most importantly, school faculty,

guidance personnel and administrators. Two new groups which should be considered are the State and Federal Occupational Information Coordinating Committees. Their establishment should increase both the demand for and use of follow-up data. Other groups such as civic organizations may also request information. Follow-up systems personnel are often asked to make presentations or to supply data to others for such presentations. Follow-up reporting, therefore, involves both printed products and oral presentations.

Experience has shown that it is a good idea to provide only requested data or data which has obvious utility for particular user groups, and also to observe a proper "chain of command" policy in the release of data. The establishment of a written policy regarding procedures for the release of data may help avoid conflicts as well as embarrassment. Data will normally be released only in aggregate form, placing the burden of analysis on the follow-up system. It is doubtful that the system can legally refuse to supply data which are not individually identifiable at reasonable cost to persons or groups with a legitimate interest. A written policy, however, may help protect the system against unreasonable demands as well as unwarranted control by administrative or funding agencies.

Interpret findings - Follow-up reports tend to be either rigidly noncommittal about what the data mean, or go so far in attempting to explain the data that they make unwarranted generalizations. The ideal lies somewhere in between, but many of the studies reviewed during the present effort were non-committal almost to the extent of sterility. Some researchers argue that it is not the proper role of the follow-up staff to make interpretations, but without doing so the data often fail to mean very much to the reader. Someone has to translate the numbers and percentages and explain what they mean in terms of such things as student and program characteristics and results.

At the very least, follow-up reports should include a brief description of the system, how the data were obtained, a description of the population and sample, return rates, and any other technical

information which will assist in making proper use of the report. Some of this information may be included in an appendix if it detracts from what the report has to say about students, programs, and results. Return rates, however, should not be omitted from the main text of the report because of their importance to the integrity of the data being reported. If there is a high probability of non-response bias or if such bias was detected through a non-respondent survey, the reader should be cautioned that the results apply only to the respondent group and cannot be generalized to the total population. In other words, what has been learned applies only to those who responded, and not necessarily to those who did not respond.

Findings should be presented in a way that avoids misinterpretation, either intentional or unintentional. No one would expect a follow-up report to be intentionally misleading, but there is always a temptation to sweeten the results a little. For example, if 325 students have rated their instruction "good" while five rated it "excellent," a statement that 330 students rated their instruction good to excellent is factually correct but obviously misleading. Another form of misinterpretation may come about through selection of improper descriptive statistics. Reporting means (averages) without any description of the variability or shape of the distribution can be misleading. In the case of a highly skewed distribution the median would be more appropriate statistic. It is always best to explain clearly and simply what the data actually reveal or do not reveal, with the fewest technical terms possible.

One of the most common technical terms which can be misleading is "significant." It has a precise mathematical meaning in statistical methodology, but in normal English usage it means "important" -- a very imprecise term. A good interpretative report to a lay audience will avoid using it altogether, simply to avoid having to explain its meaning in the context in which it is used. This points out the importance of planning the kind of a report to be produced. If it is going to be used only by a technical audience, then it should be written in the precise language of scientific research. If its

principal audiences are to be educational administrators, teachers, researchers, advisory committees, school boards, and other public groups, it must be equally clear and understandable to all of them.

Format reports - Good reports cost money, both in staff time and actual production costs. It is doubtful, however, that the place to get stingy is where most users have their only chance to judge the system. Reports should not necessarily be elaborate or costly, but neither should they be run off on cheap paper on the school mimeograph. There is a common tendency to judge the quality of the contents to some extent by the quality of the document. The actual organization of the report and its structural design, as well as its style, should be governed by the nature of the audience for which it is intended and the purposes they expect it to serve.

As a rule, follow-up reports are of two kinds, planned and special. Planned reports are those which were anticipated and planned for as the system was being developed. They are intended for the identified user groups who were involved in the design of the follow-up, including participating programs and schools, State Department of Education personnel, advisory committees, and others. Special reports, on the other hand, are prepared on request for official agencies, civic groups, researchers or others. Both planned and special reports may take the form of an in-depth presentation and interpretation of the data collected and analyzed, or of a concise summary. In most cases, planned reports will be produced in sufficient quantity to warrant the use of graphics, a good grade of paper, and typeset printing. Special reports may or may not require as much attention to such details.

One kind of planned report which has probably not been adequately used is a general report to the public. This can be a very informative document through which general awareness and acceptance of vocational education is increased. Every effort should be made in such a report to enhance communications through the use of histograms, pie charts, bar braphs, illustrations and other graphic techniques. Actual

data content should be limited to those elements which would be interesting and informative to a broad spectrum of the population.

Special reports may be requested throughout the year. In many cases, they can be developed from data already analyzed and provided in one or more of the planned reports. Occasionally, a special report will require additional analyses and interpretation. Since most special reports are for a more restricted audience and involve a specific request for some portion of the data, use of straight data tables and accompanying narrative are usually appropriate. Again, it is helpful to have a written policy regarding procedures to be followed in requesting and in furnishing such special reports.

A number of the systems included in the review document have developed excellent reporting formats, and these can be quite helpful in developing new systems. They vary considerably in content, style, appearance, and even audiences to which they are directed. Anyone considering the development or modification of a follow-up system would be well advised to obtain copies of several. Each system is unique in some respects, and no single report is likely to serve the purposes of another system completely, but the concepts and ideas from several may form the basic structure of what the new system needs.

Prepare Documentation

Without adequate and accurate documentation of the follow-up system and its costs and data, doubts may be raised about any or all of the critical considerations which went into its planning and development -- cost, quality, and adaptability. Moreover, in the event of staff turn-over, considerable duplication can be avoided and orientation of new personnel made easier if the system is well documented. Documentation can also furnish the evidence needed to maintain or change the level of support required for the system's continuing operation. Most existing follow-up systems are unclear about the extent to which they have formally documented their costs, procedures, or data. Unfortunately, documentation is often viewed as a nice thing to do if time permits, an attitude which ignores the importance of formal

documentation. Its prevelance suggests that, unless definite plans and procedures are established for documenting the system, it is unlikely to occur. Since the follow-up system will typically be undergoing change, a periodic review of documentation is necessary.

Documentation is generally contained within manuals which can be classified into three basic types: Instructional Manuals or Guides, Procedures Manuals, and System Manuals. In some cases it may not be necessary to prepare all three in order to define the system adequately. There is some overlap in the information they contain, the major differences being in the way information is presented and the amount of detail included. Each type of manual is intended to meet specific needs.

Prepare instructional manuals or guides - Instructional manuals or guides are any documents primarily used to train individuals working with the system. While such manuals are most often used with a decentralized follow-up, they are also useful with centralized systems as well. Examples are found in the bibliography as entry numbers 40, 72, 99 and 243. These are intended to be instructional manuals or guides, but in some cases they border on being procedures manuals.

Essentially, such guides include information about how to collect the data. The particular kinds of information that should be included depends on the methods and procedures used, e.g. copies of data collection instruments, instructions for completing instruments, scripts to be read during data collection activities, information about how data are to be coded, orientation information, description of common problems, when and to whom data should be returned, and how to obtain help if problems arise. These manuals are designed to provide the basic information necessary to work with the system.

Prepare procedures manuals - These are considerably more technical than instructional manuals or guides. They are designed to provide exact information to members of the follow-up staff regarding technical

procedures. The manual should describe in some detail the exact routine to be followed in each phase of the follow-up, e.g. training procedures for field staff, data collection, data analysis, and disseminating reports. Procedures manuals are not intended to merely describe the system. They are useful when evaluating the system, and as a resource to other groups and individuals who are considering establishing a follow-up system. Bibliography entries 65, 142, 170, 175, and 197 are examples of this type of document.

Prepare system manuals - The system manual should have three major sections: procedures, data documentation, and costs. The procedures section provides a complete technical, historical and procedural description of the system. The development of the system is described including the rational for making decisions about methodology and procedures. The development of the instrument is described and relevant validity and reliability information included. Changes in or comparisons of different methodologies or procedures are reported if any occurred. The specific computer programs used to analyze the data are identified and described if machine processing is used. If special programs were written for use with the follow-up system they should also be included, as well as descriptions of any program modifications which have been made. The historical record of response rates obtained and such operational details as budget, staff positions, and evaluation reports should be included in the system manual.

The section describing the data should provide all information needed to evaluate or use the data. Each specific data item should be described in terms of its range of legal values, what each code means, and where it exists in an individual data record. If standardized test scores are included in the data, the name of the test, the form or revision, and the time administered should also be included. It is often useful to identify each question in the instrument with its corresponding data item or items. If any interpretations were made in coding the information from the instrument, they should be noted.

Finally, if the data are stored on magnetic tape or disk, the format information necessary for retrieval should be included.

A third section of the system manual contains cost data on developing and operating the system. In order to achieve a complete and accurate record, the following are suggested categories to be included:

Personnel - Salaries (full-time and/or pro-rated), fringe benefits and training of professional, clerical, technical and local staff.

Travel - Expenses incurred in the development and operation of the system and in behalf of the system.

Contractural Services - Consultants, printing, keypunching, computer, and maintenance.

Communications - Postage and telephone.

Office Supplies and Materials - Consumable items, but may include inexpensive non-consumable items.

Special Supplies - Items used for prompts, incentives, or public relations purposes.

Equipment - Non-consumable items necessary in operating the system such as typewriters, copy machine, etc.

Overhead - Office space, heating and lighting, custodial expenses.

Other - All costs which do not properly belong in any of the descriptive categories, for example if fund raising activities were used to obtain money for a mini-computer, their expenses would be included here.

These particular categories are not necessarily those which should be used if a different set fits the local accounting system. What is important is that all costs be entered. When this has been done and the columns totaled, the next question is, how should these costs be reported. If the follow-up is a one-shot effort, all costs are reported only once including both initial development and operations. If it is a recurring activity, developmental costs should be prorated over a period of several years.

Four kinds of expenditure information appear to be most useful: total cost, total developmental cost, total operational cost, and cost per usable response. The importance of the first three is obvious. Several kinds of unit costs are suggested in the follow-up literature, including cost per attempted contact, cost per person, and cost per response. Since the intent of the follow-up is to obtain usable data, the best measure of cost per unit would seem to be cost per usable response. Another important factor in reporting costs is an explanation of how they are computed. This may range from simply identifying the types of costs included to a complete itemization including rate schedules. Without some information about how costs are computed, it is not possible to make adequate cost analyses and judgments. Examples of cost reporting can be found in bibliographic entry numbers 67, 89, and 96.

In summary, if complete and accurate documentation of the system is to be achieved, it must be built in as the system is developed. Documentation must be a planned, on-going, systematic effort. It is highly likely that documentation as an afterthought will be incomplete and of doubtful accuracy. Whether three separate manuals are necessary for adequate documentation depends on the complexity of the system. The main object is to describe the system in enough detail to make clear what was done, what was obtained, and what it cost.

Evaluate and Modify the System

Evaluate the System

A follow-up system may be designed to supply the data necessary for decision makers to assess programs, carry out improvements, and plan for the future. It is also a valuable means through which to increase awareness and/or support for vocational education. Any system which plays such a critical role should itself be subject to evaluation. Evaluation can serve both a formative (how can it be improved) and a summative (how well did it work) function. The formative evaluation is conducted during both development and operation of the system

with the primary intent of improving one or more of its components. The summative evaluation investigates the effectiveness of the complete system.

Evaluate system outcomes - The extent to which the system meets its stated objectives is the main evaluation question, but not the only one since its objectives might be met but not in the time required or at reasonable costs. Any system however, which consistently does not accomplish what it was created to do will probably not be around very long. Since objectives vary to some extent from system to system, evaluation designs will also vary. It should be kept in mind that system objectives as stated are often difficult to measure. Each objective, however, can be described by one or more anticipated outcomes or indicators of outcomes, and these are measurable. For example, providing accurate and timely information useful for accomplishing the objective "To assess how well the program prepared individuals for employment and/or future education" may be addressed by several items in both the former student and the employer follow-up surveys. The collective results of the student and employer assessment of training quality may be evaluated in terms of item completion by respondents and usefulness of the data acquired to the requesting individuals or groups. The process of aligning objectives with specific data is in itself a valuable check on system effectiveness. A particular data item may contribute to more than one objective but any item which does not contribute to at least one objective should be questioned.

Evaluate system procedures - While objectives-outcomes evaluation is critical to overall evaluation and improvement of the system, evaluation of both development and operating procedures may point the way to more efficient or effective practices. Procedures used to obtain response during the data collection, for example, may be found in some cases to have been too costly or to have produced unacceptable results. Data recording or coding procedures may have been less efficient or

accurate than were anticipated. Excessive variation in staff workload may indicate a need for rescheduling or reassignment of tasks.

Accurate documentation of the procedures employed during both development and operation of the system is necessary in evaluating those procedures. A considerable amount of formative evaluation of procedures usually takes place during development and initial testing, but a more formal retrospective review in the context of the total system is also advisable. In the development and early testing stage, the system is under constant scrutiny and review, but usually on a step-by-step basis. Even initial testing is very limited and specific in scope. Only after a full cycle of the total system is it possible to look back over that experience and assess the extent to which the pieces all went together and the resulting performance was satisfactory. In all probability some redesign -- some changes -- will have to be made, and not only after the first year of operation but after the second and third and perhaps each year. Advances in the technology of follow-up systems are being made each year, and that alone is reason enough for a periodic evaluation.

Solicit external evaluation - Three primary sources of evaluative data are the system documentation, system output, and system users. The use of follow-up data in assessing objectives-outcomes congruence and of system documentation in process evaluation were discussed in the previous section. Feedback from users is a third and very important source for assessing the "value" of the system. The previous two sources are normally internal sources while the latter is a measure of the external validity of the total effort. Many systems receive unsolicited feedback, both positive and negative, from users. For example, additional data and clarification of findings may be requested, errors pointed out, and the results questioned. While these judgements may have some value in system improvement, unsolicited feedback usually represents a small and uneven sample of user evaluation. A survey of data recipients would be better but is seldom done. Some of the methods which are used to obtain feedback from system users are:

1. Inclusion of a form in each follow-up report with a request that it be completed and returned.
2. Formal meetings with representatives of each user group with the announced purpose of evaluating the system.
3. A mail-out survey of user groups using an evaluation questionnaire.

A rough indication of the short term impact may be obtained by asking to what extent the reports and information from the system were or are being used. Asking the users for their appraisal of impact may also be helpful in making an evaluation. Usually the evaluation will be conducted by the follow-up staff but sometimes unusual problems or the insistence of funding sources may require use of external evaluators. A number of agencies, as well as individuals who have extensive experience, are able to do this.

Modify the System

System modification is a continuing process, as already noted. Changes in the needs of users, new reporting requirements by Federal or State agencies, changes in programs or populations, advances in technology, and other changes external to the actual follow-up system often mandate change. Regular evaluation, both formal and informal, will almost always identify modifications that could be made. There are several points to keep in mind:

- One or more procedural or product components of the system may need to be modified due to changing external factors which affect the system.
- Modifications may be mandated by inefficiencies or inadequacies of existing system components.
- Modifications may be investigated routinely to improve the system even though it is functioning satisfactorily -- these may be motivated by the desire to increase adaptability, improve quality, reduce cost or maximize the accomplishment of one or more system objectives.

- Modifications of any one part of a system is apt to affect one or more other parts of the system. Therefore, consideration should be given to the system-wide impact of proposed modifications.
- Modifications necessitate further evaluation to assess their effectiveness.

Evaluation and modification is a cyclical process. Informal evaluation takes place as the system is developed and during its operation. Such evaluation, however, tends to focus on a single component or procedure at a particular point in time. The cumulative affect of modifications brought about through such informal procedures may therefore not be known. Thus, it is advisable to periodically conduct a more structured formal evaluation of the total system, which is better able to assess interactions of components within the system. As a final note, the importance of accurate and total system documentation has been stressed. The same emphasis should be placed on documentation of all modifications. The system which is carefully designed, with adequate attention to the flexibility or adaptability of its major components, will have less difficulty in meeting the need for modification whenever this occurs.